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ABSTRACT

An overview of two science and technology resources (financial support and scientific/technical personnel) is presented, based on a series of National Science Foundation (NSF) surveys on research and development (R&D) resources and scientific/technical personnel in the United States. Areas addressed related to national perspectives of R&D resources include the R&D effort and national economy, R&D performance, R&D by national objective, R&D and the gross national product, basic research, applied research, development, and international comparisons. Areas addressed related to science/engineering (S/E) personnel include current employment opportunities, labor market conditions for S/E doctorates, and labor market dynamics. Eighty-seven detailed statistical tables are included, providing data related to R&D resources (national perspective, federal government, industry, colleges/universities) and S/E personnel (current supply and utilization patterns of S/E population, doctorate scientists/engineers, and dynamics of S/E labor market). Data reported indicate among others that total U.S. spending reached an estimated $61.1 billion in 1980 (13 percent more than the $54.2 billion in 1979 and double the amount spent in the early seventies) and that although employment opportunities in jobs involving S/E activity are weak in some fields of science, almost all scientists/engineers seeking jobs find them. (Author/JN)

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foreword

The National Science Foundation (NSF) has been collecting and analyzing extensive data pertaining to the Nation's science and technology (S&T) resources for nearly three decades. Effective S&T programs depend upon numerous types of resources ranging from creative individuals to the institutions that provide them a means to exercise their skills. This report, the second of a new series, provides a concise and current overview of two of these resources — financial support and scientific and technical personnel. It is based primarily on a series of NSF surveys on R&D resources and scientific and technical personnel in the United States, which are generally conducted on an annual or biennial basis.

Although data on both can be used as indicators of S&T activity, and although each complements the other in showing the extent and distribution of national efforts, both have some inherent weaknesses when used in this fashion. R&D dollars provide a measure of financial support and, when deflated, of activity. The lack of a precise R&D deflator, however, and the variations in unit costs for different types of R&D activity blur the picture. Likewise, personnel data provide an accurate count of individuals involved in science and technology and their characteristics, but these data do not sort out variations in effectiveness or creativity. Notwithstanding such shortcomings, however, these resources provide pieces of a mosaic which, when put together, present a fairly reasonable picture.

This report is a useful complement to the National Science Board's *Science Indicators* series and *Science and Engineering Personnel: A National Overview* developed by the Division of Science Resources Studies. The 1981 data presented in this current report reflect the recent (March 1981) revisions in R&D programs contained in the Federal 1981 budget.

The Division of Science Resources Studies, which is responsible for the generation of these reports, continuously seeks suggestions for improvement of their publications from the user community. Comments on possible improvements will be greatly appreciated and will help in the development of future reports.

Charles E. Falk
Director, Division of Science
Resources Studies
Directorate for Scientific,
Technological, and
International Affairs

April 1981

acknowledgments

This report was prepared by John Chirichiello, Senior Staff Associate for Intersectoral Affairs, and Michael Crowley, Senior Staff Associate, Scientific and Technical Personnel Studies Section.

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summary

r&d resources

Total U.S. R&D spending reached an estimated $61.1 billion in 1980, 13 percent more than the $54.2 billion in 1979 and double the amount spent annually in the early seventies. In constant dollars, the 1979-80 increase was an estimated 4 percent.[1] The U.S. R&D effort has increased in real terms each year since 1975, largely because of Federal energy R&D increases and general industrial growth. In 1980 the largest area of Federal R&D growth was in space, because of space-shuttle requirements, whereas energy remained about level.

In 1981, total U.S. R&D expenditures are expected to increase by 13 percent (3 percent in constant dollars) over 1980 levels to more than $69 billion (chart 1), with the largest absolute and relative increase anticipated in the industrial sector. This rise can be partially attributed to growth in funds used for energy and defense R&D projects and according to industry representatives, for projects to meet government regulatory requirements.

The ratio between total R&D expenditures and the Nation's gross national product (GNP) is expected to increase slightly to 2.4 percent in 1980 and 1981. This ratio peaked at about 3 percent in the midsixties, declined steadily to 2.3 percent in 1973, and remained at about that level through 1979 (chart 2).

The United States spends more money annually on R&D activities than any other nation, and twice the total amount spent by the other major Western countries and Japan combined. Relative to the GNP, U.S. R&D expenditures have been equal to those of West Germany since the early seventies, with the United Kingdom and Japan close behind. In recent years, however, the rate of increase in R&D funding for a number of these countries has been higher than in the United States.

Full-time-equivalent (FTE) employment of R&D scientists and engineers in 1981 is estimated at 670,000 — a 4-percent increase over the 1980 figure. FTE employment has been increasing steadily since 1972, when about 520,000 were employed. This growth has occurred primarily in the industrial sector and reflects, in large part, increased emphasis on energy-related R&D efforts since the midseventies.

During 1980, the Federal Government spent an estimated $29.3 billion for R&D activities, 10 percent more than in 1979, representing about one-half of the national total. In constant dollars, however, the increase between the two years was 1 percent. In 1981, Federal R&D support is expected to increase 11 percent to $32.7 billion,[2] reflecting increased Federal spending on defense activities. Non-Federal support is likely to rise 15 percent and 14 percent, respectively, in 1980 and 1981 to $36.4 billion in the latter year.[3]

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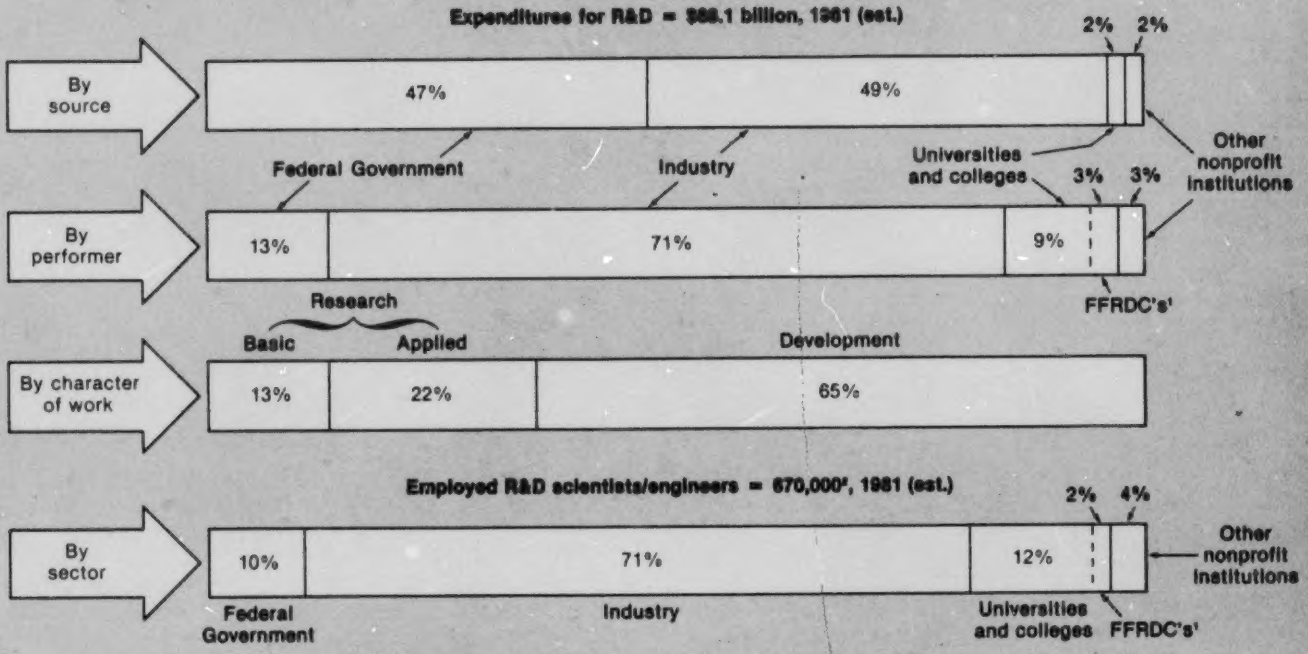
[1] In the absence of a reliable R&D cost index, the implicit price deflator for the GNP has been used to convert R&D expenditures to constant dollars. The GNP deflator includes the effects of price changes for all goods and services in the economy and, therefore, can only indicate approximate changes in costs of inputs specifically related to R&D performance. The increase in the GNP deflator between 1978 and 1979 was 9 percent.

[2] National Science Foundation, "Real Growth Unlikely in 1980 Federal R&D Funding," *Science Resources Studies Highlights* [NSF 79-319] (Washington, D.C., Nov. 16, 1979).

[3] Office of Management and Budget, "Special Analysis K," *The Budget of the United States Government, Fiscal Year 1981* (Washington, D.C.: U.S. Government Printing Office, 1980), p. 303.

Chart 1. The national R&D effort

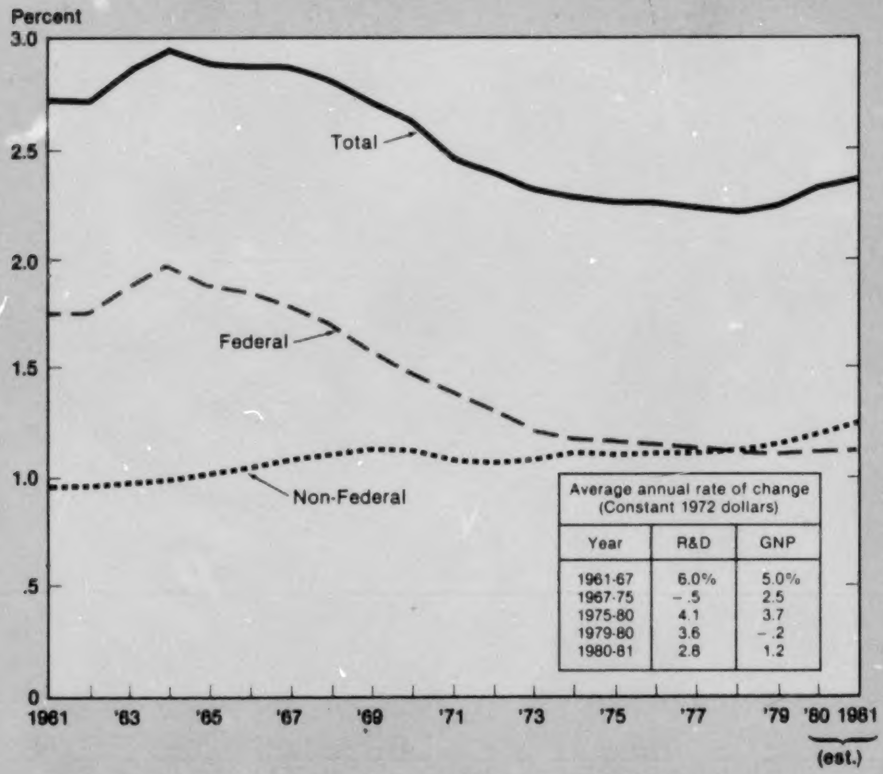


[1] Federally funded research and development centers administered by universities and colleges.

[2] Full-time-equivalents.

SOURCE: National Science Foundation; appendix tables 5, 6, 7, 9, 11, and 14

Chart 2. R&D/GNP



Average annual rate of change (Constant 1972 dollars)

Year	R&D	GNP
1961-67	6.0%	5.0%
1967-75	–.5	2.5
1975-80	4.1	3.7
1979-80	3.6	–.2
1980-81	2.8	1.2

SOURCES: National Science Foundation and Department of Commerce; appendix table 15

Total research spending in the United States in 1981 is expected to reach $24 billion — about $9 billion for basic research, and $15 billion for applied research. These levels represent increases of 8 percent and 11 percent, respectively, over 1980 figures. Development spending is expected to increase to $45 billion, or about 15 percent, between 1980 and 1981 (chart 3). These changes reflect two phenomena: (1) real-term decreases in Federal health and space basic research efforts, and (2) high development costs associated with defense projects.

The Federal Government is expected to be the source of about 55 percent of the Nation's research effort in 1981. This high level of support is particularly evident in basic research where the Government is the source of nearly 70 percent of the funds and where other sectors tend to underinvest.[4] The Federal Government is also expected to be the source of 45 percent both of the Nation's applied research and of development. These proportions have changed little since 1975, when the government supported about 50 percent of the Nation's applied research and development.

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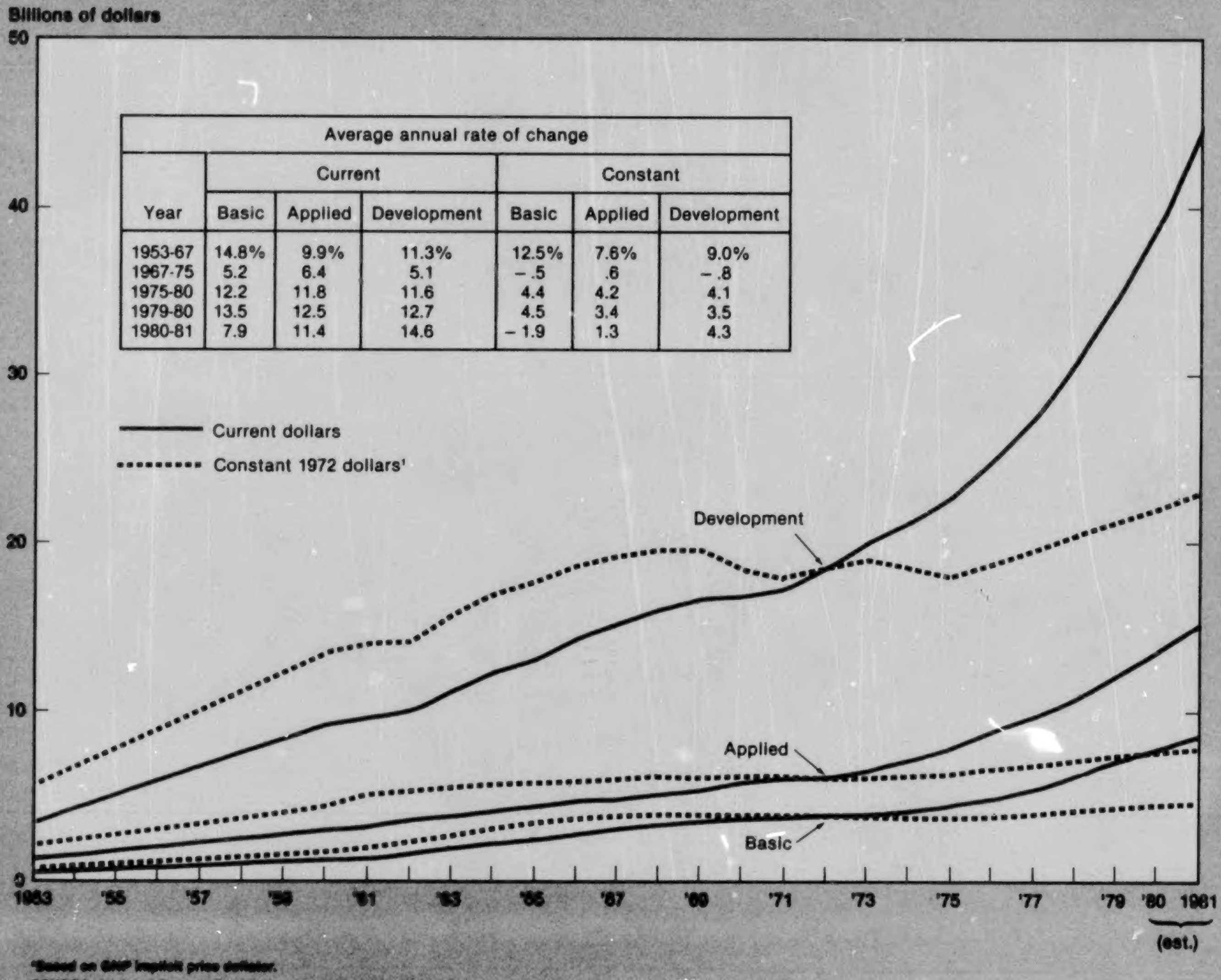
[4] Department of Commerce, *1979 U.S. Industrial Outlook* (Washington, D.C.: U.S. Government Printing Office, January 1979.

Chart 3. National R&D spending by character of work



	Average annual rate of change					
	Current			Constant		
Year	Basic	Applied	Development	Basic	Applied	Development
1953-67	14.8%	9.9%	11.3%	12.5%	7.6%	9.0%
1967-75	5.2	6.4	5.1	−.5	.6	−.8
1975-80	12.2	11.8	11.6	4.4	4.2	4.1
1979-80	13.5	12.5	12.7	4.5	3.4	3.5
1980-81	7.9	11.4	14.6	−1.9	1.3	4.3

¹Based on GNP implicit price deflator.

SOURCE: National Science Foundation; appendix tables 7, 9, and 11

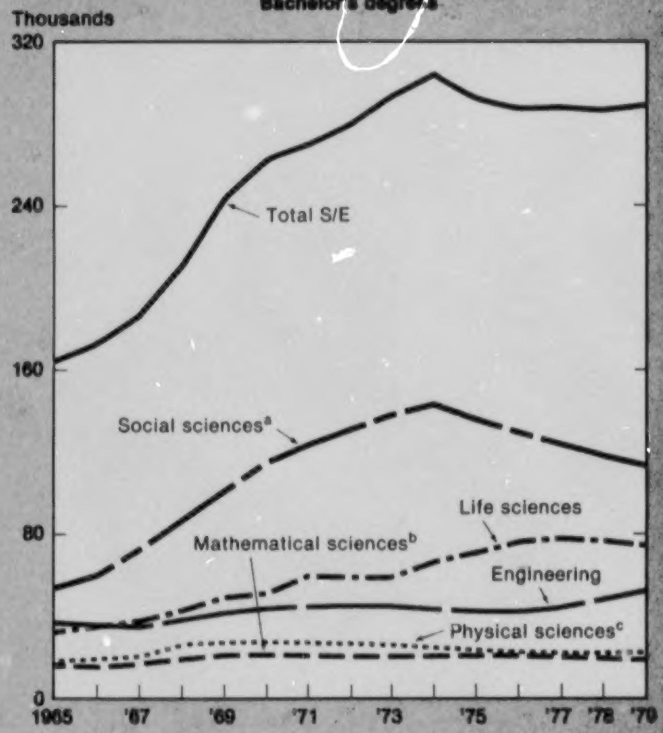
s/e personnel

Recent data indicate strong employment demand for engineers, computer specialists, environmental scientists, and physical scientists (primarily chemists) between 1978 and 1980. Each of these fields experienced increases exceeding 10 percent in jobs involving science and engineering (S/E) activities (chart 4). However, employment for life and social scientists showed little change.

Although employment opportunities in jobs involving S/E activity are weak in some fields of science, available data show that almost all scientists and engineers seeking jobs find them. Overall employment (in both S/E and non-S/E activities) of scientists and engineers increased by over 10 percent between 1978 and 1980. Engineers and computer specialists accounted for about 80 percent of this employment growth. In addition, the unemployment rate for S/E personnel in 1980 was essentially unchanged from 1978

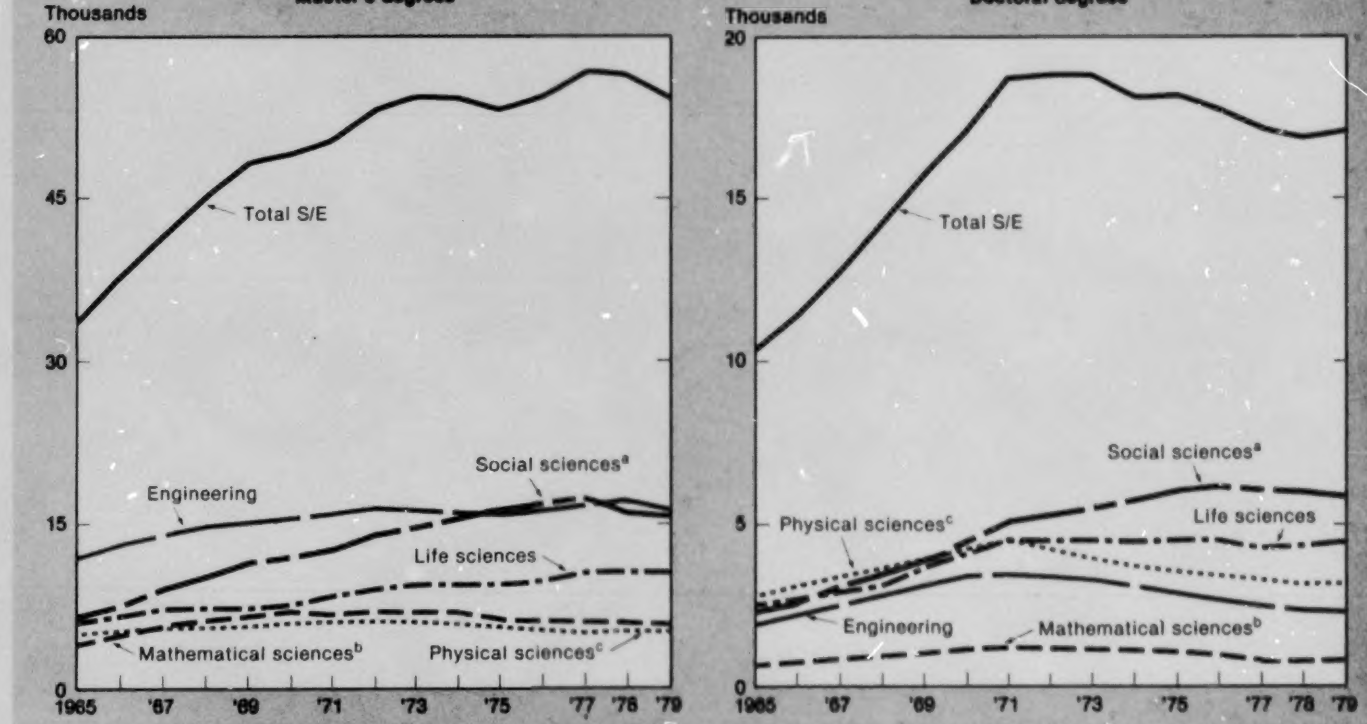
Chart 4. Science/engineering degree production

Bachelor's degrees



Master's degrees

Doctoral degrees



[a] Includes psychology.

[b] Includes computer specialties.

[c] Includes environmental science.

[d] SOURCE: National Science Foundation; appendix tables 84, 85, and 86

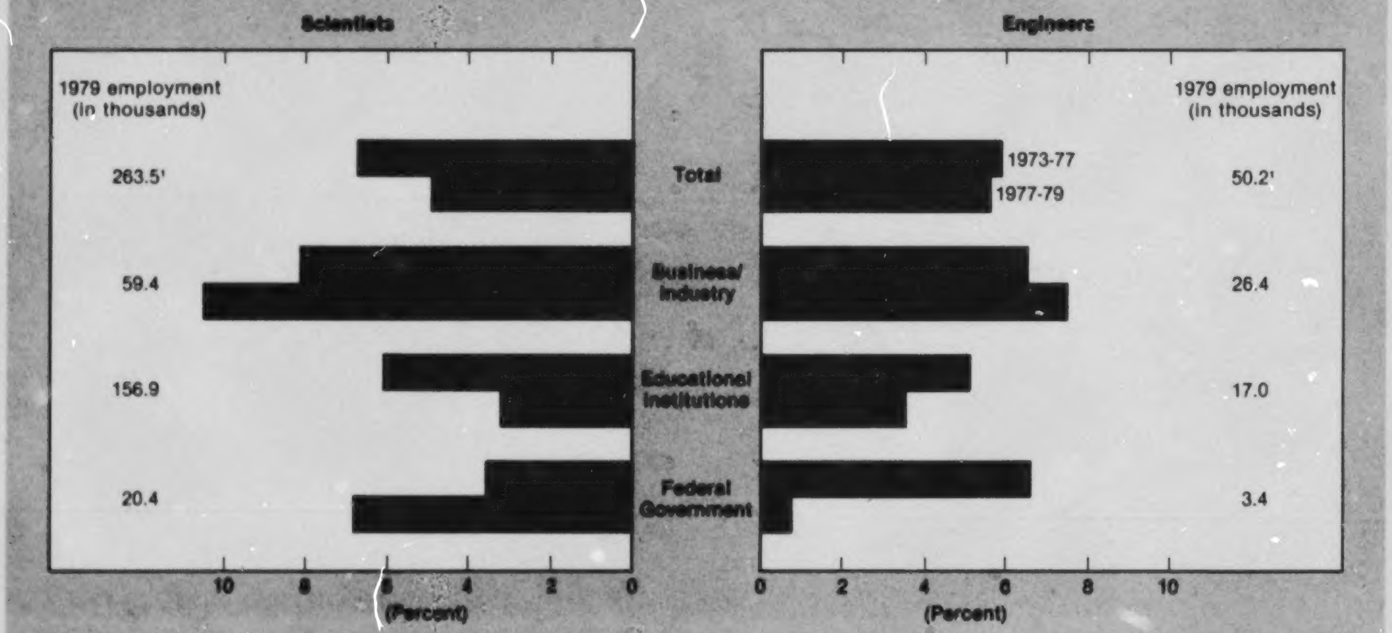
when it was 1.4 percent and down from the 3.0 percent experienced in 1976. The unemployment rates for specific fields also indicate relatively strong demands for engineers, computer specialists, and environmental scientists.

Employment of S/E doctorates continued to show strong gains between 1977 and 1979, largely because of industrial demand, but the recent rate of growth (10 percent) was less rapid than those experienced in the early- and mid-seventies. Employment of S/E doctorates in business and industry increased more than twice as rapidly as in educational institutions between 1977 and 1979 (15.9 percent vs. 6.6 percent), accelerating a trend that began in the early seventies. Strong industrial demand for engineers and computer specialists at both the Ph.D. and the baccalaureate levels point to a continuation of unfilled academic vacancies and favorable employment prospects for Ph.D.'s in these fields.

R&D activities of S/E Ph.D.'s have changed recently, most notably in the business and industry sector. The number reporting research as their primary activity declined whereas the number reporting development activities increased, resulting in a net decline of 2 percent between 1977 and 1979 in the number of employed S/E Ph.D.'s who reported research and development (excluding R&D management) as their primary work activity.

Current and future S/E labor market balances depend on a number of critical factors, primarily the number of new entrants to the S/E labor force. Other factors include mobility between S/E and non-S/E jobs and among occupations and attrition from the S/E labor force. New scientists and engineers are drawn primarily from recent college graduates. The annual number of S/E bachelor's degrees granted has fallen slightly since 1974, although the number granted in engineering increased dramatically (29 percent between 1977 and 1979) in the late seventies. Annual S/E master's-degree production has remained relatively stable since 1972 and the number of S/E doctorates granted annually has slowly decreased since 1973 (chart 5). Demographic and economic factors indicate that those trends are likely to continue in the near future.

Chart 5. Doctoral science/engineering employment growth by sector: average annual growth rate: 1973-77 and 1977-79



¹Includes "other sectors."

SOURCE: National Science Foundation, unpublished data

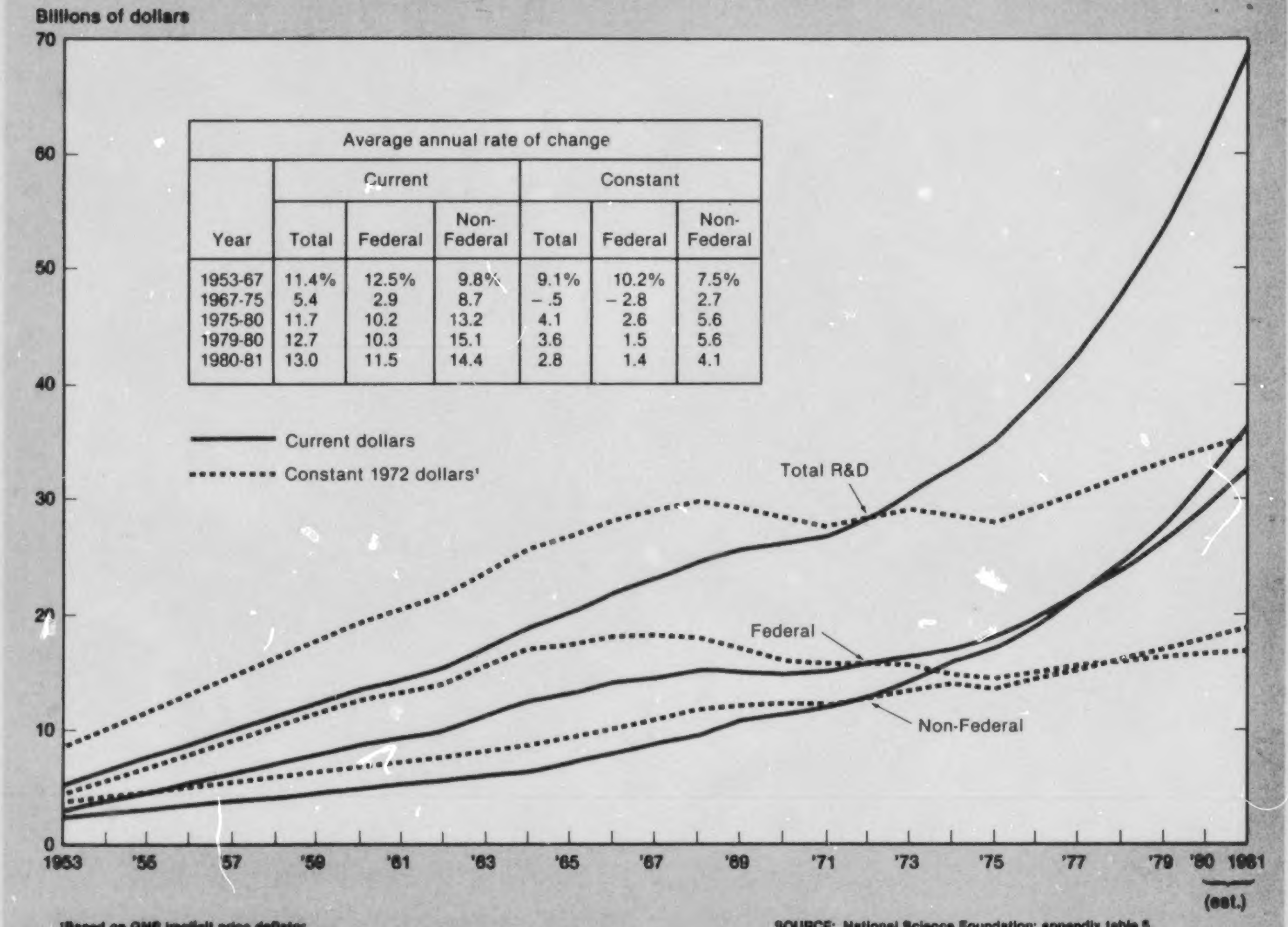
national perspectives of r&d resources

the r&d effort and the national economy

In 1980 total U.S. R&D spending reached an estimated $61.1 billion. This was an increase of 13 percent over the 1979 level, or 4 percent in constant dollars. For 1981 the overall increase in R&D support is estimated at 13 percent, or 3 percent in real terms, using the Office of Management and Budget's (OMB) inflation estimate of 10 percent (chart 6) to $69.1 billion.

The changes estimated for 1980 and 1981 are a continuation of a trend which began in 1975. Since that time real-term R&D spending has increased in the United States following a decade of no growth. The increases have been nearly equal to those recorded during the first seven years of the sixties. During the 1975-80 period, the Nation's R&D expenditures increased in real terms by an average of more than 4 percent per year. Non-Federal funding increased at twice the rate of Federal R&D funding over this period — 6 percent annually vs. 3 percent. Industry, which accounted for about one-half the national R&D total in 1980, was pri-

Chart 6. National R&D funding



Average annual rate of change

Year	Current			Constant		
	Total	Federal	Non-Federal	Total	Federal	Non-Federal
1953-67	11.4%	12.5%	9.8%	9.1%	10.2%	7.5%
1967-75	5.4	2.9	8.7	-.5	-2.8	2.7
1975-80	11.7	10.2	13.2	4.1	2.6	5.6
1979-80	12.7	10.3	15.1	3.6	1.5	5.6
1980-81	13.0	11.5	14.4	2.8	1.4	4.1

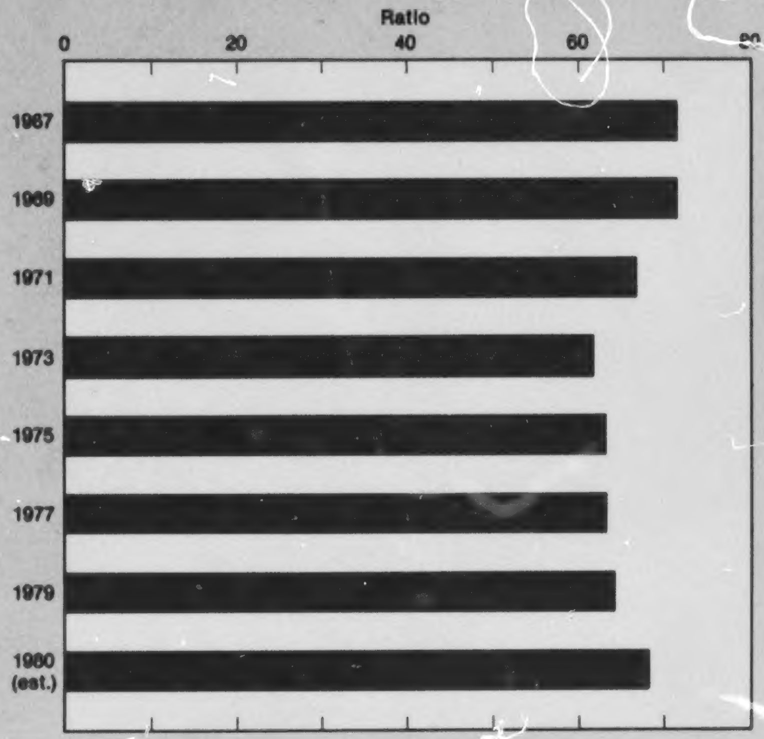
¹Based on GNP implicit price deflator.

SOURCE: National Science Foundation; appendix table 5 marily responsible for the growth in non-Federal funding. Defense-, space-, and energy-related research and development were the primary components of the growth in Federal funding. Inflation probably has been the chief deterrent to the growth of R&D support during this period.

In 1981 an estimated 670,000 FTE scientists and engineers will be employed on R&D activities. This is 4 percent more than were employed in 1980 and 30 percent more than in 1973. For every 10,000 persons in the total employed civilian labor force in 1979, 64 were FTE R&D scientists or engineers. This ratio has increased each year since 1973 when 61 out of 10,000 were FTE R&D scientists or engineers (chart 7). The expected rise in R&D funding through 1981 plus a relatively level employed labor force should result in an increase in this ratio at least through that year.

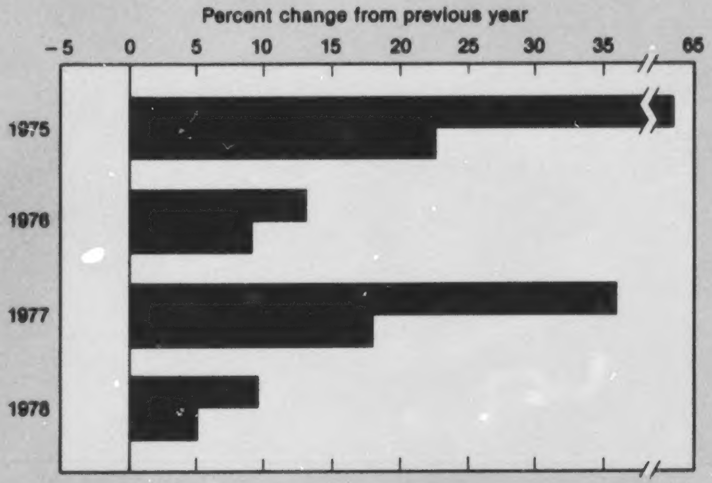
Increases in the U.S. R&D effort since 1975 have been heavily influenced by the search for solutions to the energy problem. Energy R&D spending currently accounts for about 10 percent of the national R&D effort. Between 1975 and 1978, both Federal and industry R&D expenditures for energy programs (chart 8) increased at average annual constant dollar rates of 24 percent for Federal and 10 percent for industry — sharply higher than the 4-percent rate for total R&D expenditures. This growth in energy expenditures occurred primarily in R&D funds provided by the Department of Energy to industry and universities and from petroleum and electrical equipment companies' own funds. Industry's prime energy R&D emphasis has been on fossil fuels and conservation, whereas the Federal R&D emphasis has been on nuclear-energy development. Since 1978, industry's energy R&D spending has continued to increase sharply in real terms and is expected to increase again in 1981; Federal energy spending remained about level in 1979 and 1980 before dropping an estimated 5 percent in 1981.

Chart 7. R&D scientists and engineers per 10,000 employed civilian labor force



SOURCES: National Science Foundation and Department of Labor; appendix table 16

Chart 8. Changes in Federal and industry energy R&D funds (Based on 1972 constant dollars)



SOURCE: National Science Foundation; appendix tables 22 and 46

r&d performance

Industry which performs 70 percent of all U.S. research and development, is expected to provide more than 90 percent of all non-Federal R&D funds in 1980 and 1981. (See table). The relationship between company-funded

Intersectoral transfers of funds used for performance of research and development, basic research, applied research, and development: 1981 (estimated)

RESEARCH AND DEVELOPMENT[1]

[Dollars in millions]

Sources of funds	Performers: Federal Government	Performers: Industry[2]	Performers: Universities and colleges[3]	Performers: Associated FFRDC's[4]	Performers: Other nonprofit institutions[2]	Total	Percent distribution, sources
Federal Government	8,965	15,750	4,100	2,300	1,550	32,665	47.3
Industry	——	[5]33,400	240	——	225	33,865	49.0
Universities and colleges	——	——	[5]1,485	——	——	1,485	2.2
Other nonprofit institutions	——	——	475	——	[5]575	1,050	1.5
Total	8,965	49,150	6,300	2,300	2,350	69,065	100.0
			8,600				
Percent distribution, performers	13.0	71.2	9.1	3.3	3.4		100.0
			12.5				

BASIC RESEARCH[1]

[Dollars in millions]

Sources of funds	Performers: Federal Government	Performers: Industry[2]	Performers: Universities and colleges[3]	Performers: Associated FFRDC's[4]	Performers: Other nonprofit institutions[2]	Total	Percent distribution, sources
Federal Government	1,172	350	3,000	900	500	5,922	67.5
Industry	——	[5]1,200	140	——	105	1,445	16.5
Universities and colleges	——	——	[5]885	——	——	885	10.1
Other nonprofit institutions	——	——	275	——	[5]245	520	5.9
Total	1,172	1,550	4,300	900	850	8,772	100.0
			5,200				
Percent distribution, performers	13.4	17.7	49.0	10.3	9.7		100.0
			59.3				

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[1] All data are estimated from reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of their respective sectors. They are estimated to account for less than 5 percent and 15 percent, respectively, of the industry and nonprofit institutions performance totals. FFRDC's are organizations exclusively or substantially financed by the Federal Government to meet a particular requirement or to provide major facilities for research and training purposes.

Intersectoral transfers of funds used for performance of research and development, basic research, applied research, and development: 1981 (estimated)

APPLIED RESEARCH[1]

[Dollars in millions]

Sources of funds	Performers						
	Federal Government	Industry[2]	Universities and colleges[3]	Associated FFRDC's[4]	Other nonprofit institutions[2]	Total	Percent distribution, sources
Federal Government	2,805	2,050	920	675	500	6,950	45.5
Industry	——	[5]7,300	80	——	75	7,455	48.8
Universities and colleges	——	——	[5]500	——	——	500	3.3
Other nonprofit institutions	——	——	175	——	[5]210	385	2.5
Total	2,805	9,350	1,675	675	785	15,290	
			$\underbrace{\qquad}_{2,350}$				
Percent distribution, performers	18.3	61.2	11.0	4.4	5.1		100.0
			$\underbrace{\qquad}_{15.4}$				

DEVELOPMENT[1]

[Dollars in millions]

Sources of funds	Performers						
	Federal Government	Industry[2]	Universities and colleges[3]	Associated FFRDC's[4]	Other nonprofit institutions[2]	Total	Percent distribution, sources
Federal Government	4,988	13,350	180	725	550	19,793	44.0
Industry	——	[5]24,900	20	——	45	24,965	55.5
Universities and colleges	——	——	[5]100	——	——	100	.2
Other nonprofit institutions	——	——	25	——	120	[5]145	.3
Total	4,988	38,250	325	725	715	45,003	
			$\underbrace{\qquad}_{1,050}$				
Percent distribution, performers	11.1	85.0	.7	1.6	1.6		100.0
			$\underbrace{\qquad}_{2.3}$				

[3] Includes agricultural experiment stations.

[4] Federally funded research and development centers (FFRDC's) administered by individual universities and colleges and by university consortia.

[5] Includes State and local government funds.

SOURCE: National Science Foundation

research and development and sales has remained relatively constant at 2 percent. In 1981, this relationship is expected to continue, and the anticipated increase in real company R&D expenditures parallels the projected 3-percent real growth in sales.[3] This increase will be stimulated by energy and environmental concerns.

NSf projects that industry's total R&D expenditures will increase 15 percent to $49 billion in 1981 with both Federal and company R&D spending increasing at the same rate. Within the industry sector, company R&D spending had been increasing at a faster constant-dollar rate — 5.7 percent annually between 1975 and 1980 — than had Federal R&D support (2.4 percent). Growth in Federal R&D support reflects, in large part, increased energy support, whereas growth in company R&D spending has closely paralleled sales increases.

Based on interviews with industrial R&D officials, growth in company R&D spending reflects in part a change in corporate strategy, which places greater emphasis on R&D performance as a source of future growth and new market opportunities. Corporate strategy, however, is only a partial explanation for recent increases in company R&D funding. The policies of the Federal Government, which provides almost 50 cents of every R&D dollar spent domestically, influence industry's own expenditures through establishment of regulations and minimum standards in areas such as environmental pollution, food and drug production, and public safety.

In the late sixties, the Government provided nearly one-half of industry's R&D performance funds. Since the midseventies, however, industry's own funds have provided for approximately two-thirds of its R&D effort, with the Government providing the remainder. This drop resulted mainly from cutbacks in the defense and space areas.

The second-largest R&D performer is the Federal Government, which conducts approximately 15 percent of the Nation's total R&D activities. It is expected that $9.0 billion will be expended for R&D activities in Federal laboratories during 1981, 11 percent more than in 1980 (chart 9). The level of expenditures for Federal intramural research and development has remained relatively constant in real terms since 1972 as both the Department of Defense and the National Aeronautics and Space Administration (NASA) have contracted more of their R&D efforts to industrial firms.

In 1981 academic R&D expenditures are expected to reach an estimated $6.3 billion, 6 percent more than in 1980. In real terms, however, a 4-percent decrease is expected between the two years, reflecting in large part Federal real-term cutbacks. Since the midseventies, academic R&D expenditures have increased each year in constant dollars with both Federal and non-Federal sources of funding contributing to these increases. Between 1975 and 1980 academic R&D expenditures increased at an annual rate of nearly 4 percent.

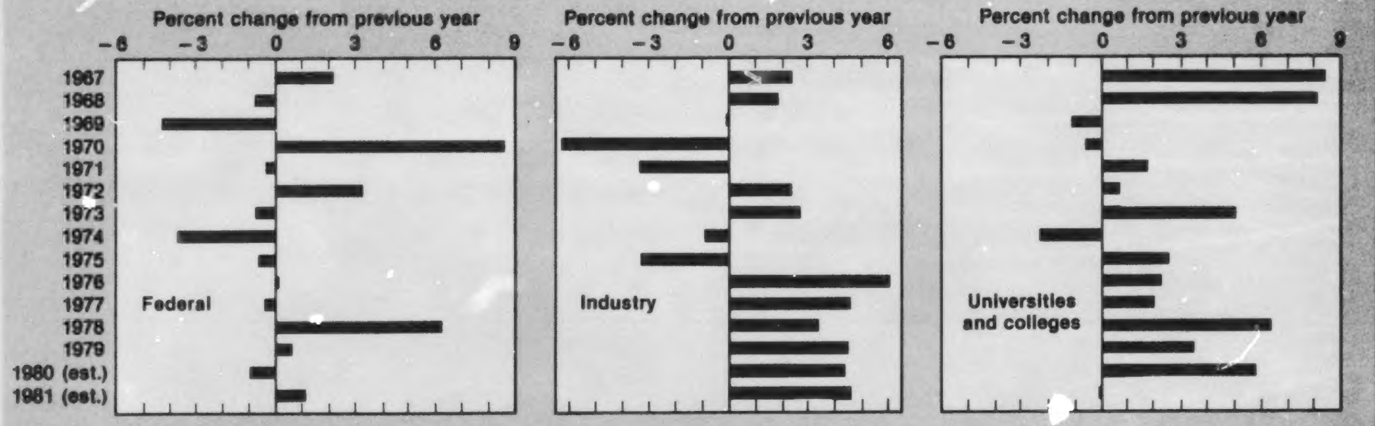
Agencies of the Federal Government fund about two-thirds of the R&D expenditures of universities and colleges. Data in their 1981 budget indicate continuing increases in Federal R&D funding at universities and colleges in real terms through 1980, and a leveling off or decline in 1981.

r&d by national objective

The largest single area of R&D spending in the United States is defense, accounting for some 25 percent of the national R&D total in recent years. Defense spending increased in real terms during the 1975-78 period by 3 percent per year and then decreased slightly through 1980. Growth is expected to resume in 1981 because the Federal 1981 budget includes a significant increase in defense R&D spending.

In the early to midsixties, 85 percent of the Federal R&D effort was spent on defense and space projects (chart 10). This share had dropped to 80 percent in the late sixties and has continued to drop relatively steadily to an estimated 65 percent during 1980 and 1981 (chart 10). Many factors contrib-

Chart 9. National R&D spending by performer (Based on 1972 dollars)



SOURCE: National Science Foundation; appendix table 6

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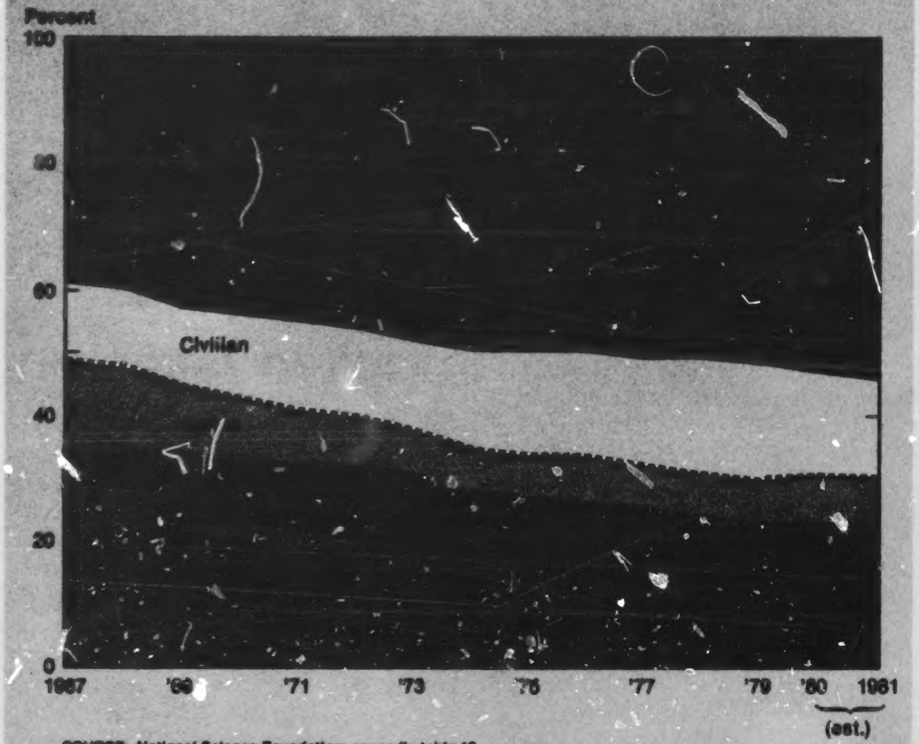
[3] National Science Foundation, *1985 R&D Funding Projections* (NSF 76-314) (Washington, D.C.: U.S. Government Printing Office, 1976.)

Chart 10. National R&D spending by objective



SOURCE: National Science Foundation; appendix table 13.

uted to these changes, including the growth of R&D programs in health, environment, and energy; the rise and phaseout of the Apollo program; and a period of non-growth in overall defense R&D programs in the early seventies. The remaining one-third of the Federal R&D effort in both 1980 and 1981 is expected to be devoted to civilian areas, with the largest dollar increases over 1979 in the general science, energy, and health fields. Since 1970, R&D expenditures for energy and health have increased from 2 percent and 7 percent of the Federal R&D total, respectively, to more than 10 percent each. The energy R&D increases over this period covered fusion, fossil fuels, solar and goethermal energy, and conservation; in health, the major increases went to cancer and heart disease. For 1981, however, the largest Federal increases are expected to be in the defense area.

Industry R&D support in 1980 and 1981 is expected to show large increases over 1979 levels in activities related to energy and the environment. Since 1972, the first year for which energy data were available, industrial R&D spending for energy has increased annually by an average of nearly 20 percent in real terms through 1978. Since 1975, when environmental data were first collected, industrial spending for environmental research and development has increased by 15 percent annually.

r&d/gnp

In both 1980 and 1981 the ratio between total U.S. R&D expenditures and the gross national product is expected to be 2.4 percent. This ratio is down from the midsixties peak of 3.0 percent, but up slightly from the 2.3 percent level between 1973 and 1979.

The drop in the R&D/GNP ratio during the midsixties to early seventies was caused primarily by the slowdown in the growth of Federal R&D programs over that period. Since that time, increases in both Federal and non-Federal R&D efforts in the energy area have been a major factor in the stabilization of this ratio through 1979. The expected slowdown in the real growth of GNP for 1980 and 1981 is the primary factor leading to anticipated increases in the ratio in the current economy. Based on projections of both R&D funding and GNP,[*] this ratio should continue to remain near its present level at least through the mideighties.

basic research, applied research, and development

Nationally, basic research, applied research, and development have each increased at the same average annual rate of 4 percent between 1975 and 1980 (chart 3). The trend in the Federal component of these three areas over this period, however, has varied somewhat from the national total. With recent administrations having emphasized constant-dollar growth in the Federal basic research effort, support here increased in real terms at twice the rate of both applied research and development — 4 percent vs. 2 percent each — from 1975 to 1980. For 1981, however, a Federal constant-dollar increase of 4 percent is expected only in development, reflecting higher defense R&D spending. Federal basic research support is expected to decline by 3 percent and Federal applied research support is expected to decline by 2 percent.

Since 1975 the proportions of national research and national development performance efforts by Federal intramural groups both dropped; Government-performed research fell from 20 percent to 17 percent in 1981 and development from 13 percent to 11 percent. Over the same timespan, industry's performance increased by corresponding amounts. These figures reflect the Government's attempts to contract more of its R&D work to the industrial sector to avoid Federal preemption of private sector efforts.

basic research

For the first time since the midseventies, national basic research spending in 1981 is not expected to increase in constant dollars, reflecting a decline in Federal basic research support, which accounts for about 70 percent of the national basic research total. In real terms, national basic research spending has increased each year since 1975, averaging 4 percent annually through 1980, with Federal support accounting for 70 percent of the increase. This upswing contrasted sharply with the trend between 1968 and 1975, when a decrease in Federal defense and space programs caused a 7-percent constant-dollar reduction in national basic research spending (chart 11).

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[*] Office of Management and Budget, op. cit.

The Federal Government support of basic research is expected to reach $5.9 billion in 1981. This support increased in real terms by 25 percent between 1975 and 1980, compared with 14 percent for total Federal R&D funding. In 1981, however, Federal basic research support is expected to drop by 3 percent in real terms, reflecting decreased space and health funding.

Industrial support of basic research is expected to reach $1.4 billion in 1981, 16 percent of the national basic research total. Since the early sixties, industry has emphasized shorter term payoffs from its R&D effort but has still increased its basic research spending in real terms by an annual average of 5 percent between 1975 and 1980, directed chiefly to energy-related research. This change follows a 9-year period in which basic research spending by industry fell at an average annual rate of 2 percent.

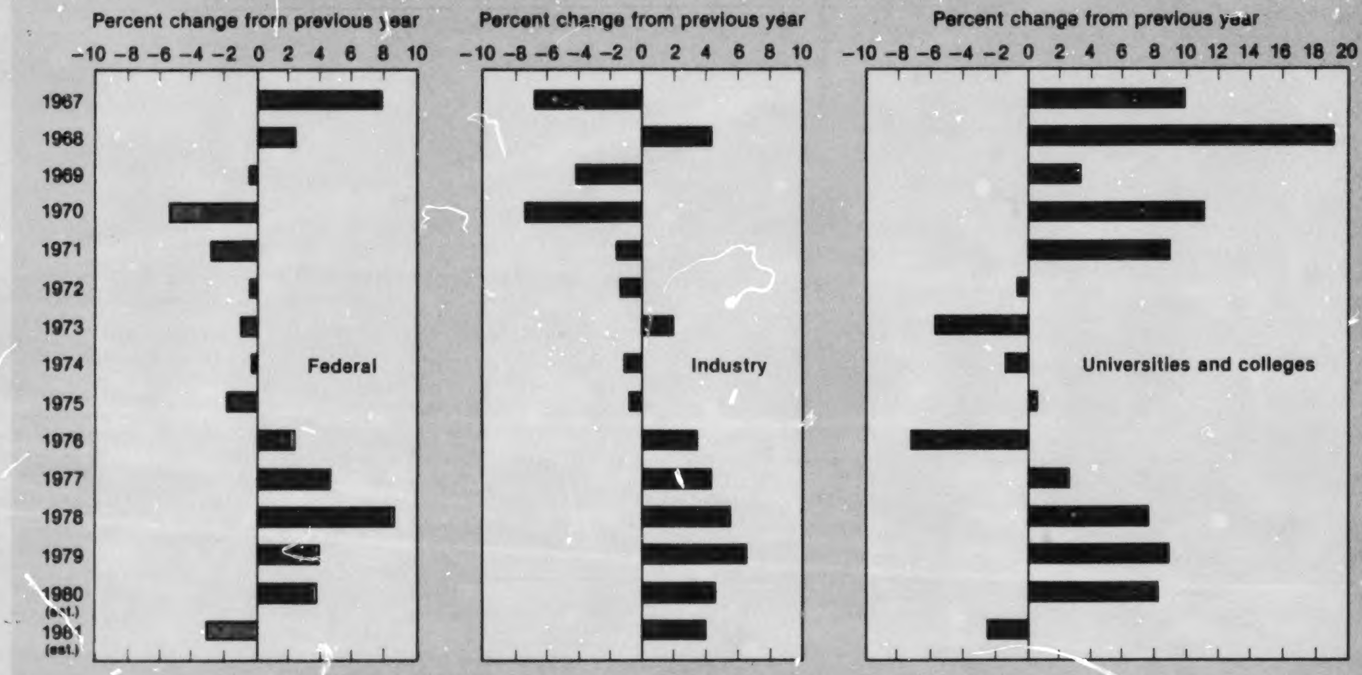
Universities and colleges spend one-half of all basic research funds in the Nation, with most of the financing provided by the Federal Government. In 1981 Federal support of academic basic research reached an estimated $3.0 billion; up from $2.8 billion in 1980 and $2.5 billion in 1979. Academic basic research funding from Federal sources has shown considerable gains, increasing 13 percent in real terms between 1975 and 1979. Non-Federal support of academic basic research increased 9 percent over the same period. There has been, however, a long-term shift in emphasis away from basic research toward applied research. Basic research accounted for 69 percent of all academic R&D expenditures in 1979, the same share it has held since the midseventies, but down sharply from 77 percent in the early seventies. The share held by applied research increased correspondingly from 19 percent in 1972 to 26 percent in 1979.

Universities and colleges are expected to spend $1.5 billion of non-Federal separately budget R&D funds in 1981. Of this amount, $900 million or 60 percent, will be spent on basic research, a ratio that has remained the same since 1976, but is down dramatically from 75 percent in 1970. University-funded basic research has increased in real terms by 30 percent between 1975 and 1980.

applied research

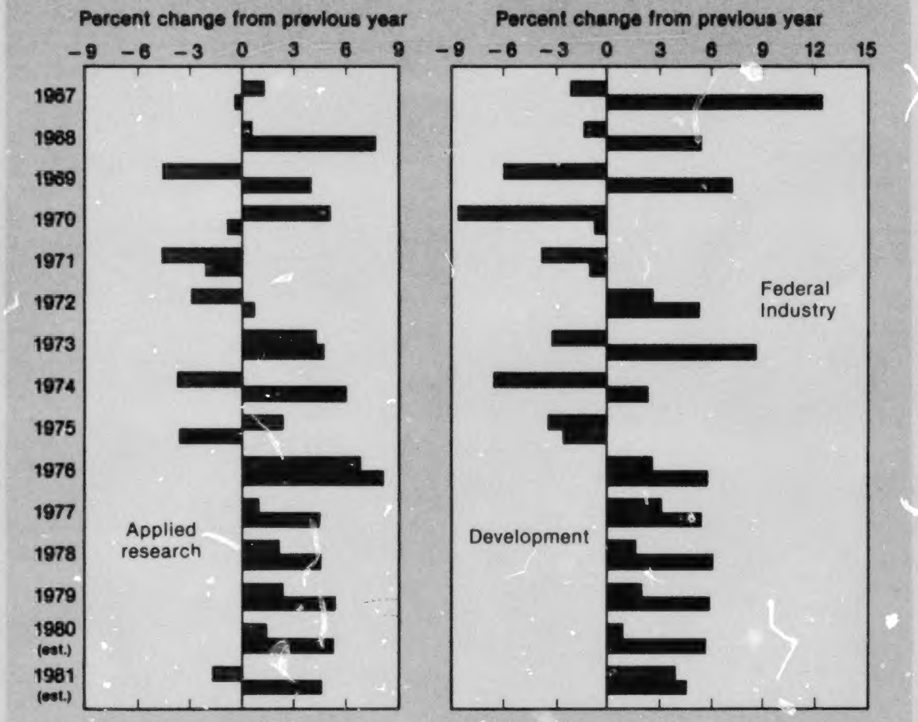
National applied research spending has increased in real terms each year between 1975 and 1980. In 1981 it is expected to increase by 2 percent over 1980. Historically, the Federal Government and industry, in that order, have been the primary sources of applied research funds. Growth in national expenditures for applied research has been brought about mainly by increased industrial support that has been concentrated in energy-related areas (chart 12). During the

Chart 11. National basic research spending by source (Based on constant 1972 dollars)



SOURCE: National Science Foundation; appendix table 7

Chart 12. Applied research and development spending by source (Based on constant 1972 dollars)



SOURCE: National Science Foundation; appendix tables 9 and 11

1975-80 period, industry's funds for applied research rose by a total of 30 percent in real terms, whereas Federal funds, reflecting a shift in emphasis from applied research to basic research, rose by 14 percent. Consequently, by 1980 industry is expected to be the largest supporter of applied research with 47 percent of the national total. In 1981 industry support is estimated at 49 percent.

Federal support for applied research has increased only slightly in real terms between 1976 and 1980. During this period, NASA's applied research spending decreased in constant dollars by 15 percent whereas all other major Federal agencies increased their applied research spending. For 1981, NASA applied research spending is expected to decrease in real terms by an additional 10 percent. Total Federal applied research in 1981 is expected to decrease nearly 2 percent from the 1980 level, as measured in constant dollars.

development

Development is the most expensive area of R&D work because of its high material and equipment costs. As a result, development activities account for approximately two-thirds of total R&D dollars. In addition, two-thirds of the R&D scientists and engineers are employed on development activities. The Nation's development effort in 1981 is expected to reach $45.0 billion, 15 percent more than in 1980. Both industry and the Federal Government, which together account for 99 percent of the total, have increased development spending in real terms each year since 1975, averaging 6 percent and 2 percent per year, respectively, through 1980. As in the case of basic research and applied research, the intensified national emphasis on energy has been a major factor behind these increases. Federal support of development is expected to increase again in 1981, reflecting a sharp increase in defense spending in that year.

Industry is expected to perform $38 billion of development in 1981 — about 85 percent of the total. In addition to spending some 70 percent of its company R&D totals on development, industry performs about 70 percent of the Federal Government's development work. In recent years, energy and environmental concerns, as well as government regulations and requirements, have influenced these funding levels. Increased defense spending is also expected to play a major role in industry's development performance in 1981.

international comparisons

The relative emphasis that different countries place on R&D activities can be approximated by comparing R&D expenditures to the GNP, or by comparing the numbers of R&D scientists and engineers to the entire labor force. These ratios overcome difficulties produced by inflation, different unit costs, and differences in size. Because countries differ in their definitions, however, these comparisons should be viewed as approximate, especially for the U.S.S.R.[7]

The United States spends more money on R&D activities than does any other country, and during the sixties had the highest R&D/GNP ratio — 3 percent in 1964 (chart 13). After that time, the U.S. ratio declined primarily because of cutbacks in Federal defense and space programs, whereas the ratios in other countries were on the increase, primarily because of larger year-to-year increases in Government R&D funding. By the midseventies, the U.S. ratio had dropped to 2.3 percent and was exceeded by West Germany (2.4 percent) and the U.S.S.R. (3.7 percent). Since the midseventies, the ratios in all countries have leveled. The U.S. ratio, however, is expected to increase slightly to 2.4 percent in both 1980 and 1981.

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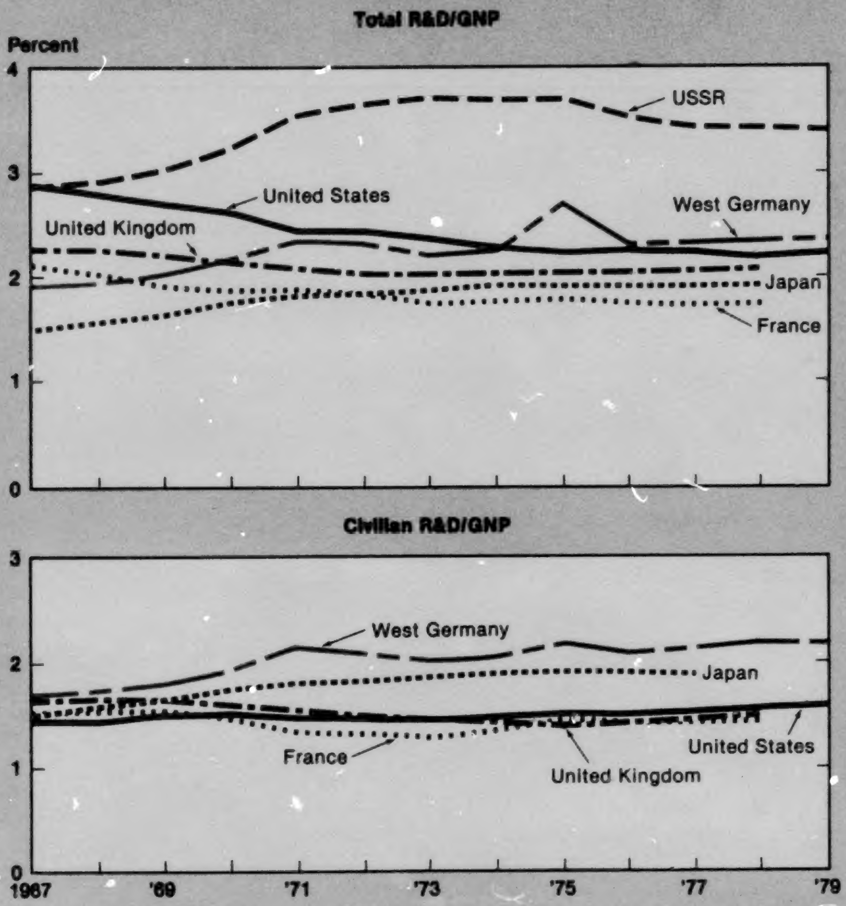
[7] Data regarding the U.S.S.R. should be treated as rough estimates because differences in Soviet R&D definitions and GNP accounting make international comparisons involving the U.S.S.R difficult.

Chart 13. International R&D/GNP

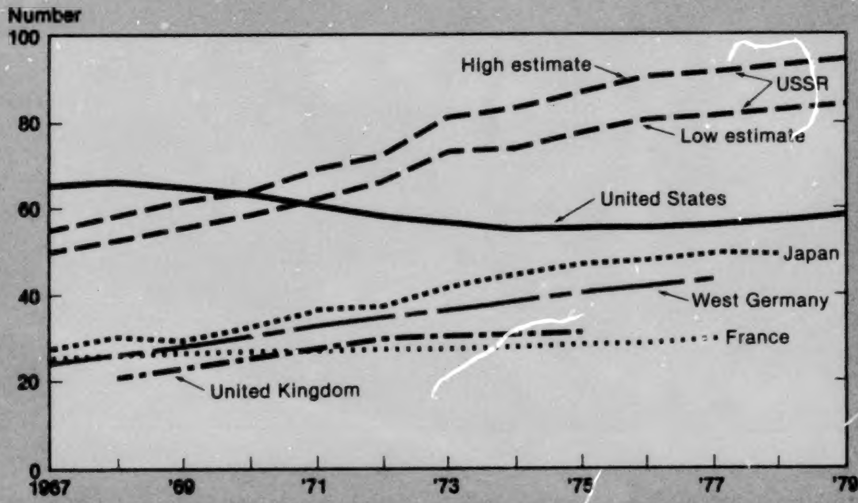


SOURCES: National Science Foundation, Organization for Economic Cooperation and Development, and Robert Campbell (Indiana University); appendix tables 17 and 19

A much lower proportion of national R&D funds is devoted to civilian activities (nondefense and nonspace) in the United States than in the Organization for Economic Cooperation and Development (OECD) member countries — 70 percent in the United States versus an average of 85 percent to 90 percent in OECD countries. When these civilian R&D expenditures are compared to the GNP, the resulting U.S. ratio of 1.6 percent is below those of West Germany (2.2 percent) and Japan (1.9 percent). These ratios in all countries have remained about level since the early seventies.

When the FTE number of R&D scientists and engineers is compared to the labor force, the U.S. ratio of about 60 per 10,000 is exceeded only by that in the U.S.S.R., where about 90 R&D professionals are employed per 10,000 labor force (chart 14). In the United States, this ratio dropped between 1968 and 1974 and has since begun to increase. This upward trend is expected to continue into the eighties because of the increased national emphasis on defense and the development of alternative energy sources. The ratios in other countries have continued to increase annually since the sixties.

Chart 14. International R&D scientists and engineers/10,000 labor force



SOURCES: National Science Foundation, Organization for Economic Cooperation and Development and Robert Campbell (Indiana University); appendix table 18

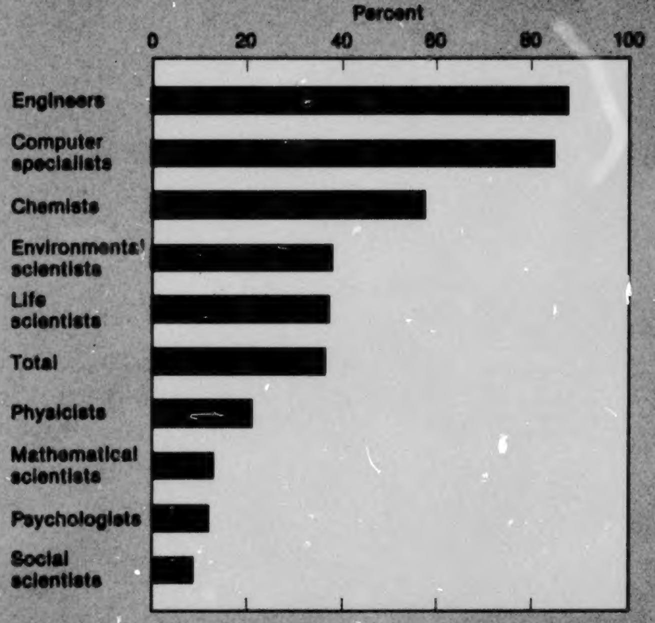
science and engineering (s/e) personnel

current employment opportunities

Recent data reflect strong employment demand for engineers, computer specialists, and chemists between 1978 and 1980. Increases exceeding 10 percent in science and engineering (S/E) employment occurred for engineers and for scientists in several fields, including computer specialties, environmental sciences, and physical sciences (primarily chemistry). Employment in S/E jobs for life and social scientists showed little change.

The 1979 employment experience of recent (1977) S/E baccalaureates supports the evidence of strong employment demand for engineers and computer specialists, and, to a lesser extent, for chemists. Of those with degrees in engineering and computer specialities, almost 9 of every 10 were working in occupations matching their degree field. In contrast, less than 15 percent of the mathematics, social science, and psychology degree-holders had such jobs (chart 15).

Chart 15. Proportion of 1977 science/engineering baccalaureates employed in 1979[a] in occupation coincident with their field of degree



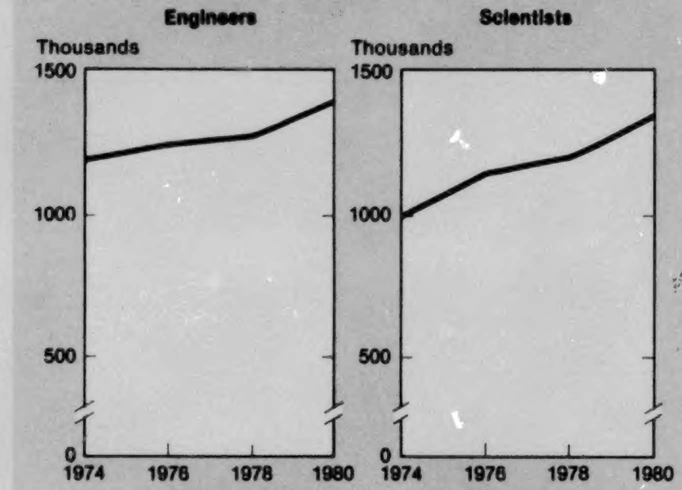
[a] Does not include full-time graduate students.

SOURCE: National Science Foundation; based on appendix table 87

Although S/E employment opportunities are weak in some fields of science, almost all scientists and engineers seeking jobs find them. Overall employment (in both S/E and non-S/E activities) of scientists and engineers increased by over 10 percent between 1978 and 1980, with engineers and computer specialists accounting for about 80 percent of this growth. This contrasts sharply with the 3-percent growth rate for the total work force (chart 16). Unemployment rates also indicate that most scientists and engineers have jobs. Between 1976 and 1978, the S/E unemployment rate fell from 3.0 percent to 1.4 percent, and remained essentially unchanged through mid-1980 (chart 17). This levelling of the unemployment rate in recent years differs from the unemployment rate for the total civilian labor force which increased from 6.0 percent to over 7 percent.

Unemployment rates varied substantially between scientists and engineers and among various fields of science. Unemployment was lower for engineers than scientists in 1980 (1.5 percent vs. 2.1 percent). Among scientists, those

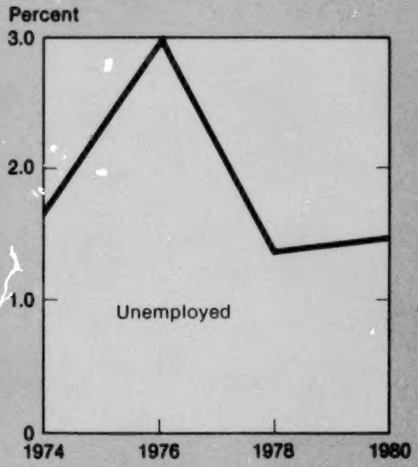
Chart 16. Employment[1] of engineers and scientists



[1]Includes employment in jobs involving either science/Engineering (S/E) or non-S/E activities.

SOURCE: National Science Foundation, appendix table 70 and unpublished data

Chart 17. Unemployment among scientists and engineers



SOURCE: National Science Foundation; appendix table 67 and unpublished data

in social and life sciences showed above-average unemployment rates. The unemployment rates for specific fields suggest relatively strong demand for engineers, computer specialists, and environmental scientists.

Unemployment, however, is a weak indicator of supply/demand balance, especially for S/E occupations in which the high level of educational attainment generally assures low rates. For example, a significant number of employed scientists and engineers could be working involuntarily in non-S/E jobs. Such involuntary employment, however, is not borne out by the evidence. Although 15 percent of employed scientists and engineers were working in non-S/E jobs in 1978, almost all had selected this type of employment voluntarily because of better career opportunities, improved pay, or more interesting work.

labor market conditions for s/e doctorates

Employment of S/E doctorates continued to show strong gains between 1977 and 1979. The recent rate of growth (10 percent) was less rapid, however, than that recorded through the mid-seventies primarily because of slower growth in the academic sector, a major employer of S/E doctorates (chart 5). The recent tapering off of enrollment increases caused this slowdown. Demographic projections indicate that this enrollment trend is likely to continue through the mideighties and may actually become a decline. The projected levelling of academic employment, combined with the current age composition of employed tenured faculty, suggests poorer future employment opportunities in this sector for graduating Ph.D. scientists. Strong industrial demands for engineers at both the Ph.D. and the baccalaureate levels, however, point to a continuation of unfilled vacancies and favorable employment prospects for Ph.D. engineers in academia.

Employment of S/E doctorates in business and industry between 1977 and 1979 increased more than twice as rapidly as in educational institutions (15.9 percent vs. 6.6 percent), accelerating a trend that began in the early seventies. Within business and industry, employment increased in all major fields of science and in engineering. Above-average increases were noted for computer specialists, environmental and social scientists, and psychologists. Rapid growth in the industry sector resulted in part from the post-1976 recovery of economic activity, and recent increases in real levels of industrial R&D expenditures.

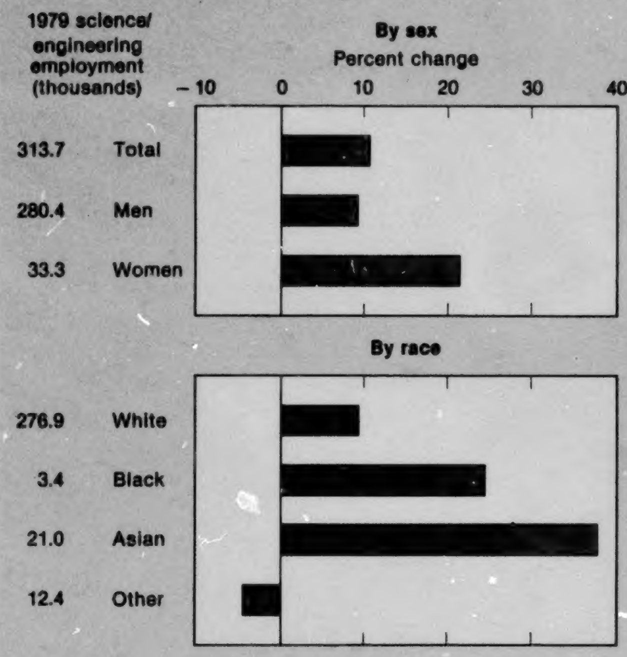
There has been a recent shift in employment activities of S/E Ph.D.'s away from R&D activities. Employment growth for those primarily employed in research and development (excluding R&D management) during the 1977-79 period was less rapid than the increase in all other activities (6.7 percent vs. 12.2 percent). This is in contrast to the early to midseventies, when R&D employment increases matched increases in other activities. The shift is most pronounced in the business and industry sector. Although total employment of S/E doctorates increased in this sector by almost 16 percent between 1977 and 1979, R&D employment (excluding R&D management) declined by almost 2 percent. The declines took place in those reporting research as their primary activity, whereas the number reporting development activities increased. These declines in research activity, however, do not necessarily imply decreased involvement in research since they were more than offset by increases in the number reporting R&D management.

The shift away from research and development did not occur in academia. Within educational institutions, the proportion of S/E doctorates who reported teaching as their primary activity continued to decline, whereas the proportion who reported research and development as their primary activity continued to increase.

Women increased their share of S/E doctorates between 1977 and 1979 and employment of women S/E Ph.D.'s increased by 21 percent compared to 9 percent for men (chart 18). Although the number of women entering the doctoral S/E work force has increased, they still represent only 10.6 percent of employed doctoral scientists and engineers.

Blacks also continued to make significant gains in employment among S/E doctorates. Between 1977 and 1979, employment of blacks increased by 25 percent, whereas employment of whites increased by 9 percent. Despite their rapid increases, however, blacks still represent only about 1 percent of all employed doctoral scientists and engineers.

Chart 18. Changes in employment of doctoral scientists and engineers: 1977-79



SOURCE: National Science Foundation; appendix table 74

labor market dynamics

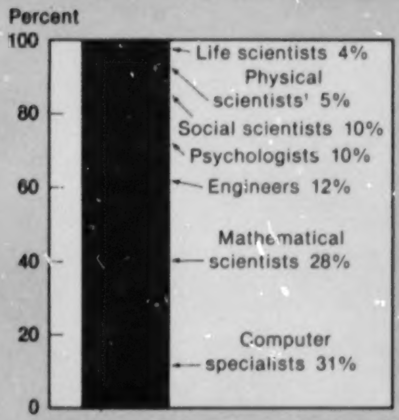
Current and future S/E labor market balance depends on a number of critical factors: the number of new entrants to the S/E labor force; the nature and extent of mobility between S/E and non-S/E jobs, and among occupations; and attrition from the S/E labor force.

New scientists and engineers are drawn primarily from recent college graduates. The annual number of S/E bachelor's degrees granted has fallen slightly since 1974, although the number granted in engineering increased dramatically (29 percent between 1977 and 1979) in the late seventies. Annual S/E master's-degree production has remained relatively stable since 1972 and the number of S/E doctorates granted annually has slowly decreased since 1973 (chart 4). Demographic and economic factors indicate that those trends are likely to continue in the near future.

The new S/E graduates' labor market experiences provide early warning signals on impending shifts in supply, as well as insight into the current demand situation. Employment of recent graduates provides a sensitive barometer of overall conditions in various fields, since any changes in employer demand are normally reflected first in employer hiring decisions. This illustrates, in addition, how supply can adjust to demand. Computer specialists are a case in point. The various labor market indicators show very strong demand for computer specialists, and the number of persons employed as computer specialists is greater than the number earning degrees in this field. Graduates from other fields, primarily mathematics, find jobs as computer specialists. Of those who earned bachelor's degrees in science or engineering in 1977 and were working as computer specialists in 1979, only 31 percent earned their degrees in the computer field. The remainder earned degrees not only in mathematics but in engineering, psychology, and the social sciences, among others (chart 19).

Mobility between S/E and non-S/E jobs can also alleviate S/E labor market imbalances. For example, almost 175,000 persons were employed in technical and related occupations other than science and engineering in 1972, and more than 67,000 of them (35 percent) had entered S/E jobs by 1978, the latest year for which data are available. About 60 percent of those were engineers. This return flow has in part been a response to the relatively strong employment opportunities for engineers. This type of mobility indicates that, to some degree, sudden surges in S/E employment demand can be met from the available pool of scientists and engineers who are not employed in S/E jobs, if the incentives are sufficiently attractive. Offsetting this inflow, approximately 175,000 scientists and engineers working in S/E jobs moved either to managerial or other non-S/E jobs between 1972 and 1978. This type of mobility can alleviate some of the adverse consequences of unexpected declines in employment demand.

Chart 19. 1977 Science/engineering baccalaureate graduates employed as computer specialists by field of degree: 1979



¹Includes environmental scientists.
SOURCE: National Science Foundation; based on appendix table 67.

Attrition from the S/E labor force because of death, retirement, or other reasons, provides job openings even when S/E employment does not grow. The attrition rate of less than 2 percent creates annual job openings for approximately 37,000 S/E professionals.

Based on these flows, the outlook in labor markets for scientists and engineers is for a continuation of supply adjustments to changing demand conditions — particularly through changes in the number of new S/E graduates. In science fields, where (with the exception of computer specialists and chemists) demand has been relatively weak, the decline noted in the number of new degrees being produced portends a slowdown in the rate of growth of supply, other things equal. In engineering fields, the rapid growth noted in the number of new degrees being produced (especially at the baccalaureate level) imply that supply will continue to increase in response to the recent rise in demand.

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Table 1. Transfers of funds expended annually for performance of research and development by sector, distributed by source: 1953 and 1960-81[1]

[Dollars in millions]

Year	Total R&D	Federal Government		Industry[2]			Universities and colleges					Associated FFRDC's[3]		Other nonprofit institutions[2]			
			Source		Sources			Sources					Source		Sources		
		Total funds used	Federal Government	Total funds used	Federal Government	Industry[4]	Total funds used	Federal Government	Industry	Universities and colleges[4]	Other nonprofit institutions	Total funds used	Federal Government	Total funds used	Federal Government	Industry	Other nonprofit institutions[4]
1953	5,124	1,010	1,010	3,630	1,430	2,200	255	138	19	72	26	121	121	108	54	26	28
1960[5]	13,523	1,726	1,726	10,509	6,081	4,428	646	405	40	149	52	360	360	282	166	48	68
1961	14,316	1,874	1,874	10,908	6,240	4,668	763	500	40	165	58	410	410	361	226	49	86
1962	15,394	2,098	2,098	11,464	6,435	5,029	904	613	40	185	66	470	470	458	295	54	109
1963	17,059	2,279	2,279	12,630	7,270	5,360	1,081	760	41	207	73	530	530	539	365	55	119
1964	18,854	2,838	2,838	13,512	7,720	5,792	1,275	917	40	235	83	629	629	600	433	55	112
1965	20,044	3,093	3,093	14,185	7,740	6,445	1,474	1,073	41	267	93	629	629	663	477	62	124
1966	21,846	3,220	3,220	15,548	8,332	7,216	1,715	1,261	42	304	108	630	630	733	525	70	138
1967	23,146	3,396	3,396	16,385	8,365	8,020	1,921	1,409	48	345	119	673	673	771	552	74	145
1968	24,605	3,494	3,494	17,429	8,560	8,869	2,149	1,573	55	390	131	719	719	814	582	81	151
1969	25,631	3,503	3,503	18,308	8,451	9,857	2,225	1,600	60	420	145	725	725	870	616	93	161
1970	26,072	4,017	4,017	18,067	7,779	10,288	2,335	1,648	61	461	165	737	737	916	649	95	172
1971	26,653	4,205	4,205	18,320	7,666	10,654	2,500	1,724	70	529	177	716	716	912	630	98	184
1972	28,429	4,542	4,542	19,552	8,017	11,535	2,630	1,795	74	574	187	753	753	952	663	101	188
1973	30,665	4,709	4,709	21,249	8,145	13,104	2,884	1,985	84	613	202	817	817	1,006	690	105	211
1974	32,814	4,861	4,861	22,887	8,220	14,667	3,023	2,032	96	677	218	865	865	1,178	822	115	241
1975	35,169	5,310	5,310	24,187	8,605	15,582	3,409	2,288	113	749	259	987	987	1,276	875	125	276
1976	38,935	5,686	5,686	26,997	9,561	17,436	3,727	2,512	123	808	284	1,147	1,147	1,376	925	135	316
1977	42,923	6,053	6,053	29,928	10,521	19,407	4,063	2,729	139	881	314	1,384	1,384	1,495	987	150	358
1978	48,023	6,856	6,856	33,164	11,163	22,001	4,614	3,057	170	1,028	359	1,717	1,717	1,672	1,100	165	407
1979 (prelim.)	54,215	7,497	7,497	37,606	12,342	25,264	5,183	3,432	194	1,183	374	1,935	1,935	1,994	1,350	180	464
1980 (est.)	61,127	8,052	8,052	42,750	13,700	29,050	5,950	3,900	225	1,385	440	2,200	2,200	2,175	1,450	200	525
1981 (est.)	69,065	8,965	8,965	49,150	15,750	33,400	6,300	4,100	240	1,485	475	2,300	2,300	2,350	1,550	225	575

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[1] All data are based on reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of the respective sectors.

[3] FFRDC's administered by individual universities and colleges and by university consortia.

[4] Includes State and local government funds.

[5] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

SOURCE: National Science Foundation

Table 2. Transfers of funds expended annually for performance of basic research by sector, distributed by source: 1953 and 1960-81[1]

[Dollars in millions]

Year	Total R&D	Federal Government		Industry[2]			Universities and colleges					Associated FFRDC's[3]		Other nonprofit institutions[2]			
		Total funds used	Source	Total funds used	Sources		Total funds used	Sources				Total funds used	Source	Total funds used	Sources		
			Federal Govern-ment		Federal Govern-ment	Industry[4]		Federal Govern-ment	Industry	Univer-sities and col-leges[4]	Other non-profit institu-tions		Federal Govern-ment		Federal Govern-ment	Industry	Other non-profit institu-tions
1953	441	101	101	151	19	132	110	73	12	10	15	33	33	46	[illegible]	[illegible]	[illegible]
1960[5]	1,197	160	160	376	79	297	433	299	24	72	38	97	97	131	[illegible]	[illegible]	[illegible]
1961	1,401	206	206	395	81	314	536	382	25	85	44	115	115	149	[illegible]	[illegible]	[illegible]
1962	1,724	251	251	488	143	345	659	481	25	102	51	136	136	190	[illegible]	[illegible]	[illegible]
1963	1,965	255	255	522	147	375	814	610	25	121	58	159	159	215	[illegible]	[illegible]	[illegible]
1964	2,289	314	314[4]	549	165	384	1,003	758	24	144	77	191	191	232	[illegible]	[illegible]	[illegible]
1965	2,555	364	364	592	186	406	1,138	879	26	164	69	208	208	253	175	[illegible]	[illegible]
1966	2,814	385	385	624	173	451	1,303	1,008	27	197	71	227	227	275	[illegible]	[illegible]	[illegible]
1967	3,056	435	435	629	202	427	1,457	1,124	31	223	79	250	250	285	[illegible]	[illegible]	[illegible]
1968	3,296	432	432	642	180	462	1,649	1,251	36	276	86	276	276	297	[illegible]	[illegible]	[illegible]
1969	3,441	532	532	618	160	458	1,711	1,279	39	298	95	275	275	305	[illegible]	[illegible]	[illegible]
1970	3,496	524	524	602	158	444	1,796	1,286	40	360	110	269	269	305	[illegible]	[illegible]	[illegible]
1971	3,630	544	544	590	134	456	1,914	1,340	46	409	119	260	260	322	[illegible]	[illegible]	[illegible]
1972	3,788	584	584	593	130	463	2,022	1,420	53	416	133	244	244	345	[illegible]	[illegible]	[illegible]
1973	3,924	586	586	631	132	499	2,053	1,454	57	408	134	297	297	357	[illegible]	[illegible]	[illegible]
1974	4,207	664	664	699	165	534	2,154	1,523	61	432	138	285	285	405	[illegible]	[illegible]	[illegible]
1975	4,575	701	701	730	157	573	2,410	1,694	72	478	166	309	309	425	[illegible]	[illegible]	[illegible]
1976	4,928	738	738	819	185	634	2,548	1,841	71	474	162	359	359	464	[illegible]	[illegible]	[illegible]
1977	5,485	867	867	911	210	701	2,795	2,020	79	576	120	402	402	510	[illegible]	[illegible]	[illegible]
1978	6,318	973	973	1,028	245	783	3,165	2,282	90	585	208	567	567	585	[illegible]	[illegible]	[illegible]
1979 (prelim.)	7,164	1,026	1,026	1,188	275	913	3,552	2,516	114	705	217	718	718	680	[illegible]	[illegible]	[illegible]
1980 (est.)	8,132	1,097	1,097	1,350	310	1,040	4,085	2,880	130	825	250	850	850	770	[illegible]	[illegible]	[illegible]
1981 (est.)	8,772	1,172	1,172	1,550	350	1,200	4,300	3,000	140	885	275	900	900	850	[illegible]	[illegible]	[illegible]

[1] All data are based on reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of the respective sectors.

[3] FFRDC's administered by individual universities and colleges and by university consortia.

[4] Includes State and local government funds.

[5] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

SOURCE: National Science Foundation

Table 3. Transfers of funds expended annually for performance of applied research by sector, distributed by source: 1953 and 1960-81[1]

[Dollars in millions]

Year	Total R&D	Federal Government		Industry[2]			Universities and colleges					Associated FFRDC's[3]		Other nonprofit institutions[2]			
			Source		Sources			Sources					Source		Sources		
		Total funds used	Federal Government	Total funds used	Federal Government	Industry[4]	Total funds used	Federal Government	Industry	Universities and colleges[4]	Other nonprofit institutions	Total funds used	Federal Government	Total funds used	Federal Government	Industry	Other nonprofit institutions[4]
1953	1,279	345	345	726	288	438	130	57	6	57	10	44	44	34	13	11	10
1960[5]	3,020	595	595	2,029	833	1,196	179	86	13	68	12	122	122	95	50	17	28
1961	3,065	634	634	1,977	812	1,165	192	98	13	69	12	135	135	127	75	17	35
1962	3,665	702	702	2,449	1,011	1,438	205	109	13	70	13	155	155	154	90	19	45
1963	3,742	715	715	2,457	1,007	1,450	227	128	14	72	13	170	170	173	105	19	49
1964	4,128	903	903	2,600	1,040	1,560	232	127	14	77	14	202	202	191	125	19	47
1965	4,339	990	990	2,658	1,038	1,620	279	157	13	88	21	204	204	208	135	21	52
1966	4,601	997	997	2,843	1,039	1,804	328	194	13	89	32	207	207	226	145	24	57
1967	4,780	1,027	1,027	2,915	1,066	1,849	374	222	15	102	35	219	219	245	160	25	60
1968	5,131	1,110	1,110	3,124	1,043	2,081	404	254	16	97	37	231	231	262	172	28	62
1969	5,316	1,114	1,114	3,287	1,015	2,272	407	246	16	105	40	210	210	298	200	32	66
1970	5,726	1,333	1,333	3,427	1,049	2,378	427	268	16	98	45	216	216	323	220	33	70
1971	5,788	1,351	1,351	3,415	974	2,441	474	292	19	115	48	210	210	338	230	34	74
1972	5,978	1,354	1,354	3,514	952	2,562	524	320	18	140	46	221	221	365	251	35	79
1973	6,588	1,471	1,471	3,825	993	2,832	713	461	23	172	57	226	226	353	234	36	83
1974	7,211	1,557	1,557	4,288	1,025	3,263	736	438	29	203	66	217	217	413	280	40	93
1975	7,871	1,738	1,738	4,570	1,130	3,440	851	516	34	224	77	264	264	448	300	43	105
1976	8,997	2,045	2,045	5,112	1,200	3,912	1,015	584	43	282	106	327	327	498	330	48	120
1977	9,784	2,062	2,062	5,656	1,331	4,325	1,068	608	46	304	110	465	465	533	345	53	135
1978	10,838	2,218	2,218	6,268	1,425	4,843	1,213	673	56	354	130	549	549	590	385	55	150
1979 (prelim.)	12,197	2,425	2,425	7,114	1,575	5,539	1,368	770	64	400	134	580	580	710	480	60	170
1980 (est.)	13,726	2,616	2,616	8,150	1,800	6,350	1,575	875	75	470	155	650	650	735	480	65	190
1981 (est.)	15,290	2,805	2,805	9,350	2,050	7,300	1,675	920	80	500	175	675	675	785	500	75	210

[1] All data are based on reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of the respective sectors.

[3] FFRDC's administered by individual universities and colleges and by university consortia.

[4] Includes State and local government funds.

[5] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

SOURCE: National Science Foundation

Table 4. Transfers of funds expended annually for performance of development by sector, distributed by source: 1953 and 1960-81[1]

[Dollars in millions]

Year	Total R&D	Federal Government		Industry[2]			Universities and colleges					Associated FFRDC's[3]		Other nonprofit institutions[2]			
			Source		Sources			Sources					Source		Sources		
		Total funds used	Federal Government	Total funds used	Federal Government	Industry[4]	Total funds used	Federal Government	Industry	Universities and colleges[4]	Other nonprofit institutions	Total funds used	Federal Government	Total funds used	Federal Government	Industry	Other nonprofit institutions[4]
1953	3,404	564	564	2,753	1,123	1,630	15	8	1	5	1	44	44	28	16	6	6
1960[5]	9,306	971	971	8,104	5,169	2,935	34	18	3	11	2	141	141	56	36	10	10
1961	9,850	1,034	1,034	8,536	5,347	3,189	35	20	2	11	2	160	160	85	61	10	14
1962	10,005	1,145	1,145	8,527	5,281	3,246	40	23	2	13	2	179	179	114	85	11	18
1963	11,352	1,309	1,309	9,651	6,116	3,535	40	22	2	14	2	201	201	151	120	11	20
1964	12,437	1,621	1,621	10,363	6,515	3,848	40	22	2	14	2	236	236	177	148	11	18
1965	13,150	1,739	1,739	10,935	6,516	4,419	57	37	2	15	3	217	217	202	170	12	20
1966	14,431	1,838	1,838	12,081	7,120	4,961	84	59	2	18	5	196	196	232	195	14	23
1967	15,310	1,934	1,934	12,841	7,097	5,744	90	63	2	20	5	204	204	241	202	15	24
1968	16,178	1,952	1,952	13,663	7,337	6,326	96	68	3	17	8	212	212	255	213	16	26
1969	16,874	1,857	1,857	14,403	7,276	7,127	107	75	5	17	10	240	240	267	221	18	28
1970	16,850	2,160	2,160	14,038	6,572	7,466	112	84	5	13	10	252	252	288	240	18	30
1971	17,235	2,310	2,310	14,315	6,558	7,757	112	83	5	14	10	246	246	252	200	19	33
1972	18,663	2,604	2,604	15,445	6,935	8,510	84	55	3	19	7	288	288	242	188	19	35
1973	20,153	2,652	2,652	16,793	7,020	9,773	118	70	4	33	11	294	294	296	238	20	38
1974	21,396	2,640	2,640	17,900	7,032	10,868	133	71	6	42	14	363	363	360	297	21	42
1975	22,723	2,871	2,871	18,887	7,318	11,569	148	78	7	47	16	414	414	403	330	22	51
1976	25,010	2,905	2,905	21,066	8,176	12,890	164	87	9	52	16	461	461	414	330	23	61
1977	27,654	3,124	3,124	23,361	8,980	14,381	200	112	14	58	16	517	517	452	352	27	73
1978	30,867	3,665	3,665	25,868	9,493	16,375	236	122	15	78	21	601	601	497	380	30	87
1979 (prelim.)	34,854	4,046	4,046	29,304	10,492	18,812	263	144	16	80	23	637	637	604	470	35	99
1980 (est.)	39,269	4,339	4,339	33,250	11,590	21,660	310	175	20	90	25	700	700	670	520	40	110
1981 (est.)	45,003	4,968	4,968	38,250	13,350	24,900	325	180	20	100	25	725	725	715	550	45	120

[1] All data are based on reports by performers.

[2] Expenditures for federally funded research and development centers (FFRDC's) administered by both industry and by nonprofit institutions are included in the totals of the respective sectors.

[3] FFRDC's administered by individual universities and colleges and by university consortia.

[4] Includes State and local government funds.

[5] Data for 1954-59 can be found in *National Patterns of R&D Resources, 1953-1977* (NSF 77-310).

SOURCE: National Science Foundation

Table 5. Sources of funds for research and development by sector: 1953 and 1960-81

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	5,124	2,753	2,245	72	54
1960	13,523	8,738	4,516	149	120
1961	14,316	9,250	4,757	165	144
1962	15,394	9,911	5,123	185	175
1963	17,059	11,204	5,456	207	192
1964	18,854	12,537	5,887	235	195
1965	20,044	13,012	6,548	267	217
1966	21,846	13,968	7,328	304	246
1967	23,146	14,395	8,142	345	264
1968	24,605	14,928	9,005	390	282
1969	25,631	14,895	10,010	420	306
1970	26,072	14,830	10,444	461	337
1971	26,653	14,941	10,822	529	361
1972	28,429	15,760	11,710	574	385
1973	30,665	16,346	13,293	613	413
1974	32,814	16,800	14,878	677	459
1975	35,169	18,065	15,820	749	535
1976	38,935	19,833	17,694	808	600
1977	42,923	21,674	19,696	881	672
1978	48,023	23,893	22,336	1,028	766
1979 (prelim)	54,215	26,556	25,638	1,183	838
1980 (est) ...	61,127	29,302	29,475	1,385	965
1981 (est) ...	69,065	32,665	33,865	1,485	1,050

Constant dollars[1]

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	8,677	4,649	3,816	121	91
1960	19,635	12,673	6,573	214	175
1961	20,584	13,282	6,861	235	206
1962	21,750	13,989	7,256	259	246
1963	23,733	15,570	7,611	285	267
1964	25,857	17,179	8,090	320	268
1965	26,896	17,443	8,806	356	291
1966	28,442	18,180	9,547	395	320
1967	29,241	18,176	10,299	434	332
1968	29,833	18,108	10,910	474	341
1969	29,586	17,209	11,536	488	353
1970	28,545	16,248	11,421	506	370
1971	27,790	15,591	11,271	553	375
1972	28,429	15,760	11,710	574	385
1973	29,112	15,551	12,579	588	394
1974	28,755	14,798	12,947	605	405
1975	28,169	14,526	12,603	608	432
1976	29,499	15,038	13,393	613	455
1977	30,654	15,464	14,085	626	479
1978	32,010	15,928	14,886	685	511
1979 (prelim)	33,304	16,312	15,751	727	514
1980 (est) ...	34,499	16,551	16,619	784	545
1981 (est) ...	35,457	16,781	17,373	763	540

[1] Based on GNP implicit price deflator.
SOURCE: National Science Foundation

Table 6. Research and Development performance by sector: 1953 and 1960-81

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	5,124	1,010	3,630	255	121	108
1960	13,523	1,726	10,509	646	360	282
1961	14,316	1,874	10,908	763	410	361
1962	15,394	2,098	11,464	904	470	458
1963	17,059	2,279	12,630	1,081	530	539
1964	18,854	2,838	13,512	1,275	629	600
1965	20,044	3,093	14,185	1,474	629	663
1966	21,846	3,220	15,548	1,715	630	733
1967	23,146	3,396	16,385	1,921	673	771
1968	24,605	3,494	17,429	2,149	719	814
1969	25,631	3,503	18,308	2,225	725	870
1970	26,072	4,017	18,067	2,335	737	916
1971	26,653	4,205	18,320	2,500	716	912
1972	28,429	4,542	19,552	2,630	753	952
1973	30,665	4,709	21,249	2,884	817	1,006
1974	32,814	4,861	22,887	3,023	865	1,178
1975	35,169	5,310	24,187	3,409	987	1,276
1976	38,935	5,688	26,997	3,727	1,147	1,376
1977	42,923	6,053	29,928	4,063	1,384	1,495
1978	48,023	6,856	33,164	4,614	1,717	1,672
1979 (prelim)	54,215	7,497	37,606	5,183	1,935	1,994
1980 (est) ...	61,127	8,052	42,750	5,950	2,200	2,175
1981 (est) ...	69,065	8,965	49,150	6,300	2,300	2,350

Constant dollars[1]

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	8,677	1,692	6,161	428	203	183
1960	19,635	2,481	15,297	928	517	412
1961	20,584	2,664	15,733	1,085	582	520
1962	21,750	2,940	16,237	1,266	659	648
1963	23,733	3,140	17,622	1,489	730	752
1964	25,857	3,868	18,569	1,738	857	825
1965	26,896	4,124	19,077	1,965	838	892
1966	28,442	4,183	20,256	2,229	819	955
1967	29,241	4,276	20,725	2,417	840	975
1968	29,833	4,246	21,116	2,612	874	985
1969	29,586	4,065	21,094	2,582	842	1,003
1970	28,545	4,413	19,756	2,564	809	1,003
1971	27,790	4,398	19,081	2,613	749	949
1972	28,429	4,542	19,552	2,630	753	952
1973	29,112	4,510	20,106	2,763	782	951
1974	28,755	4,342	19,915	2,700	773	1,025
1975	28,169	4,315	19,263	2,771	802	1,018
1976	29,499	4,321	20,435	2,831	871	1,041
1977	30,654	4,307	21,403	2,890	985	1,069
1978	32,010	4,572	22,103	3,076	1,145	1,114
1979 (prelim)	33,304	4,604	23,104	3,182	1,188	1,226
1980 (est) ...	34,499	4,556	24,103	3,367	1,245	1,228
1981 (est) ...	35,457	4,612	25,216	3,239	1,183	1,207

[1] Based on GNP implicit price deflator.
SOURCE: National Science Foundation

Table 7. Sources of funds for basic research by sector: 1953 and 1960-81

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	441	251	153	10	27
1960	1,197	715	342	72	68
1961	1,401	874	361	85	81
1962	1,724	1,131	394	102	97
1963	1,965	1,311	425	121	108
1964	2,289	1,598	433	144	114
1965	2,555	1,809	461	164	121
1966	2,814	1,978	510	197	129
1967	3,056	2,201	492	223	140
1968	3,296	2,336	535	276	149
1969	3,441	2,441	540	298	162
1970	3,496	2,436	528	350	182
1971	3,630	2,487	547	400	196
1972	3,788	2,592	563	415	218
1973	3,924	2,687	605	408	224
1974	4,207	2,880	651	432	244
1975	4,575	3,106	705	478	286
1976	4,928	3,388	769	474	297
1977	5,485	3,778	850	519	338
1978	6,318	4,382	962	596	378
1979 (prelim)	7,164	4,937	1,112	703	412
1980 (est)	8,132	5,557	1,265	825	485
1981 (est)	8,772	5,922	1,445	885	520

Constant dollars[1]

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	742	421	259	17	45
1960	1,729	1,030	497	103	99
1961	2,004	1,246	521	121	116
1962	2,427	1,590	558	143	136
1963	2,720	1,811	592	167	150
1964	3,129	2,182	595	196	156
1965	3,416	2,415	620	219	162
1966	3,660	2,571	665	256	168
1967	3,853	2,774	622	281	176
1968	4,001	2,837	649	335	180
1969	3,985	2,829	623	346	187
1970	3,837	2,675	578	384	200
1971	3,792	2,600	570	418	204
1972	3,788	2,592	563	415	218
1973	3,745	2,568	573	391	213
1974	3,732	2,564	567	386	215
1975	3,700	2,518	563	388	231
1976	3,740	2,573	582	360	225
1977	3,906	2,689	607	369	241
1978	4,211	2,921	641	397	252
1979 (prelim)	4,400	3,032	683	432	253
1980 (est)	4,599	3,144	714	467	274
1981 (est)	4,510	3,046	742	455	267

[1] Based on GNP implicit price deflator.
SOURCE: National Science Foundation

Table 8. Basic research performance by sector: 1953 and 1960-81

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	441	101	151	110	33	46
1960	1,197	160	376	433	97	131
1961	1,401	206	395	536	115	149
1962	1,724	251	488	659	136	190
1963	1,965	255	522	814	159	215
1964	2,289	314	549	1,003	191	232
1965	2,555	364	592	1,138	208	253
1966	2,814	385	624	1,303	227	275
1967	3,056	435	629	1,457	250	285
1968	3,296	432	642	1,649	276	297
1969	3,441	532	618	1,711	275	305
1970	3,496	524	602	1,796	269	305
1971	3,630	544	590	1,914	260	322
1972	3,788	584	593	2,022	244	345
1973	3,924	586	631	2,053	297	357
1974	4,207	664	699	2,154	285	405
1975	4,575	701	730	2,410	309	425
1976	4,928	738	819	2,548	359	464
1977	5,485	867	911	2,795	402	510
1978	6,318	973	1,028	3,165	567	585
1979 (prelim)	7,164	1,026	1,188	3,552	718	680
1980 (est)	8,132	1,097	1,350	4,065	850	770
1981 (est)	8,772	1,172	1,550	4,300	900	850

Constant dollars[1]

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	742	169	256	184	55	78
1960	1,729	230	547	622	139	191
1961	2,004	293	570	763	163	215
1962	2,427	352	692	923	191	269
1963	2,720	351	728	1,122	219	300
1964	3,129	428	755	1,367	260	319
1965	3,416	485	796	1,518	277	340
1966	3,660	500	813	1,693	295	359
1967	3,853	548	796	1,834	315	360
1968	4,001	525	778	2,003	335	360
1969	3,985	617	712	1,985	319	352
1970	3,837	576	659	1,973	295	334
1971	3,792	569	615	2,001	272	335
1972	3,788	584	593	2,022	244	345
1973	3,745	561	597	1,966	284	337
1974	3,732	593	608	1,924	255	352
1975	3,700	570	581	1,959	251	339
1976	3,740	561	620	1,935	273	351
1977	3,906	617	651	1,988	286	364
1978	4,211	649	685	2,110	378	389
1979 (prelim)	4,400	630	730	2,181	441	418
1980 (est)	4,599	621	761	2,301	481	435
1981 (est)	4,510	603	796	2,211	463	437

[1] Based on GNP implicit price deflator.
SOURCE: National Science Foundation

Table 9. Sources of funds used for applied research by sector: 1953 and 1960-81

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	1,279	747	455	57	20
1960	3,020	1,688	1,226	66	40
1961	3,065	1,754	1,195	69	47
1962	3,665	2,067	1,470	70	58
1963	3,742	2,125	1,483	72	62
1964	4,128	2,397	1,593	77	61
1965	4,339	2,524	1,654	88	73
1966	4,601	2,582	1,841	89	89
1967	4,780	2,694	1,889	102	95
1968	5,131	2,810	2,125	97	99
1969	5,316	2,785	2,320	105	106
1970	5,726	3,086	2,427	98	115
1971	5,788	3,057	2,494	115	122
1972	5,978	3,098	2,615	140	125
1973	6,588	3,385	2,891	172	140
1974	7,211	3,517	3,332	203	159
1975	7,871	3,948	3,517	224	182
1976	8,997	4,486	4,003	282	226
1977	9,784	4,811	4,424	304	245
1978	10,838	5,250	4,954	354	280
1979 (prelim)	12,197	5,830	5,663	400	304
1980 (est) ...	13,726	6,421	6,490	470	345
1981 (est) ...	15,290	6,950	7,455	500	385

Constant dollars[1]

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	2,164	1,260	774	96	34
1960	4,380	2,442	1,785	95	58
1961	4,399	2,511	1,723	98	67
1962	5,175	2,913	2,082	98	82
1963	5,201	2,947	2,069	99	86
1964	5,658	3,280	2,189	105	84
1965	5,818	3,379	2,224	117	98
1966	5,989	3,359	2,398	116	116
1967	6,036	3,398	2,390	128	120
1968	6,223	3,411	2,574	118	120
1969	6,139	3,221	2,674	122	122
1970	6,271	3,383	2,654	108	126
1971	6,036	3,192	2,597	120	127
1972	5,978	3,098	2,615	140	125
1973	6,262	3,227	2,736	165	134
1974	6,333	3,112	2,900	181	140
1975	6,316	3,185	2,802	182	147
1976	6,819	3,403	3,030	214	172
1977	6,985	3,430	3,164	216	175
1978	7,226	3,501	3,302	236	187
1979 (prelim)	7,492	3,581	3,479	246	186
1980 (est) ...	7,749	3,629	3,659	266	195
1981 (est) ...	7,851	3,572	3,824	257	198

[1] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 10. Applied research performance by sector: 1953 and 1960-81

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	1,279	345	726	130	44	34
1960	3,020	595	2,029	179	122	95
1961	3,065	634	1,977	192	135	127
1962	3,665	702	2,449	205	155	154
1963	3,742	715	2,457	227	170	173
1964	4,128	903	2,600	232	202	191
1965	4,339	990	2,658	279	204	208
1966	4,601	997	2,843	328	207	226
1967	4,780	1,027	2,915	374	219	245
1968	5,131	1,110	3,124	404	231	262
1969	5,316	1,114	3,287	407	210	298
1970	5,726	1,333	3,427	427	216	323
1971	5,788	1,351	3,415	474	210	338
1972	5,978	1,354	3,514	524	221	365
1973	6,588	1,471	3,825	713	226	353
1974	7,211	1,557	4,288	736	217	413
1975	7,871	1,738	4,570	851	264	448
1976	8,997	2,045	5,112	1,015	327	498
1977	9,784	2,062	5,656	1,068	465	533
1978	10,838	2,218	6,268	1,213	549	590
1979 (prelim)	12,197	2,425	7,114	1,368	580	710
1980 (est) ...	13,726	2,616	8,150	1,575	650	735
1981 (est) ...	15,290	2,805	9,350	1,675	675	785

Constant dollars[1]

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	2,160	578	1,235	219	74	58
1960	4,380	855	2,954	257	175	139
1961	4,399	901	2,851	272	192	183
1962	5,175	984	3,469	287	217	218
1963	5,201	985	3,428	312	234	242
1964	5,658	1,231	3,573	316	275	263
1965	5,818	1,320	3,575	371	272	280
1966	5,989	1,295	3,704	427	269	294
1967	6,036	1,293	3,687	470	276	310
1968	6,223	1,349	3,785	491	281	317
1969	6,139	1,293	3,787	472	244	343
1970	6,271	1,464	3,747	469	237	354
1971	6,036	1,413	3,556	495	220	352
1972	5,978	1,354	3,514	524	221	365
1973	6,262	1,409	3,620	683	216	334
1974	6,333	1,391	3,731	657	194	360
1975	6,316	1,412	3,640	692	215	357
1976	6,819	1,553	3,869	772	248	377
1977	6,985	1,467	4,045	760	331	382
1978	7,226	1,479	4,178	809	366	394
1979 (prelim)	7,492	1,489	4,371	840	356	436
1980 (est) ...	7,749	1,480	4,595	891	368	415
1981 (est) ...	7,851	1,443	4,797	861	347	403

[1] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 11. Sources of funds used for development by sector: 1953 and 1960-81

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	3,404	1,755	1,637	5	7
1960	9,306	6,335	2,948	11	12
1961	9,850	6,622	3,201	11	16
1962	10,005	6,713	3,259	13	20
1963	11,352	7,768	3,548	14	22
1964	12,437	8,542	3,861	14	20
1965	13,150	8,679	4,433	15	23
1966	14,431	9,408	4,977	18	28
1967	15,310	9,500	5,761	20	29
1968	16,178	9,782	6,345	17	34
1969	16,874	9,669	7,150	17	38
1970	16,850	9,308	7,489	13	40
1971	17,235	9,397	7,781	14	43
1972	18,663	10,070	8,532	19	42
1973	20,153	10,274	9,797	33	49
1974	21,396	10,403	10,895	42	56
1975	22,723	11,011	11,598	47	67
1976	25,010	11,959	12,922	52	77
1977	27,654	13,085	14,422	58	89
1978	30,867	14,261	16,420	78	108
1979 (prelim)	34,854	15,789	18,863	80	122
1980 (est)	39,269	17,324	21,720	90	135
1981 (est)	45,003	19,793	24,965	100	145

Constant dollars[1]

Year	Total	Federal Government	Industry	Universities and colleges	Other nonprofit institutions
1953	5,771	2,968	2,783	8	12
1960	13,526	9,201	4,291	16	18
1961	14,181	9,525	4,617	16	23
1962	14,148	9,486	4,616	18	28
1963	15,812	10,812	4,950	19	31
1964	17,070	11,717	5,306	19	28
1965	17,662	11,649	5,962	20	31
1966	18,793	12,250	6,484	23	36
1967	19,352	12,004	7,287	25	36
1968	19,609	11,860	7,687	21	41
1969	19,462	11,159	8,239	20	44
1970	18,437	10,190	8,189	14	44
1971	17,962	9,799	8,104	15	44
1972	18,663	10,070	8,532	19	42
1973	19,105	9,756	9,270	32	47
1974	18,690	9,122	9,480	38	50
1975	18,153	8,823	9,238	38	54
1976	18,940	9,062	9,781	39	58
1977	19,763	9,345	10,314	41	63
1978	20,573	9,506	10,943	52	72
1979 (prelim)	21,412	9,699	11,589	49	75
1980 (est)	22,151	9,778	12,246	51	76
1981 (est)	23,096	10,163	12,807	51	75

[1] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 12. Development performance by sector: 1953 and 1960-81

[Dollars in millions]

Current dollars

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	3,404	564	2,753	15	44	28
1960	9,306	971	8,104	34	141	56
1961	9,850	1,034	8,536	35	160	85
1962	10,005	1,145	8,527	40	179	114
1963	11,352	1,309	9,651	40	201	151
1964	12,437	1,621	10,363	40	236	177
1965	13,150	1,739	10,935	57	217	202
1966	14,431	1,838	12,081	84	196	232
1967	15,310	1,934	12,841	90	204	241
1968	16,178	1,952	13,663	96	212	255
1969	16,874	1,857	14,403	107	240	267
1970	16,850	2,160	14,038	112	252	288
1971	17,235	2,310	14,315	112	246	252
1972	18,663	2,604	15,445	84	288	242
1973	20,153	2,852	16,793	118	294	296
1974	21,396	2,640	17,900	133	363	360
1975	22,723	2,871	18,887	148	414	403
1976	25,010	2,905	21,066	164	461	414
1977	27,654	3,124	23,361	200	517	452
1978	30,867	3,665	25,868	236	601	497
1979 (prelim)	34,854	4,046	29,304	263	637	604
1980 (est)	39,269	4,339	33,250	310	700	670
1981 (est)	45,003	4,988	38,250	325	725	715

Constant dollars[1]

Year	Total	Federal Government	Industry	Universities and colleges	Associated FFRDC's	Other nonprofit institutions
1953	5,771	945	4,680	25	74	47
1960	13,526	1,396	11,796	49	203	82
1961	14,181	1,470	12,312	50	227	122
1962	14,148	1,604	12,076	56	251	161
1963	15,812	1,804	13,466	55	277	210
1964	17,070	2,209	14,241	55	322	243
1965	17,662	2,319	14,706	76	289	272
1966	18,793	2,388	15,739	109	255	302
1967	19,352	2,435	16,242	113	257	305
1968	19,609	2,372	16,553	118	258	308
1969	19,462	2,155	16,595	125	279	308
1970	18,437	2,373	15,350	122	277	315
1971	17,962	2,416	14,910	117	257	262
1972	18,663	2,604	15,445	84	288	242
1973	19,105	2,540	15,889	114	282	280
1974	18,690	2,358	15,576	119	324	313
1975	18,153	2,333	15,042	120	336	322
1976	18,940	2,207	15,946	124	350	313
1977	19.763	2,223	16,707	142	368	323
1978	20,573	2,444	17,240	157	401	331
1979 (prelim)	21,412	2,485	18,003	161	391	372
1980 (est)	22,151	2,455	18,747	175	390	378
1981 (est)	23,096	2,566	19,623	167	373	367

[1] Based on GNP implicit price deflator.

SOURCE: National Science Foundation

Table 13. Trends in Federal and non-Federal R&D outlays: 1953 and 1960-81

[Percents]

Year	Federal				Non-Federal
	Total	Defense related	Space related	Civilian related	
1953	54	48	1	5	46
1960	65	52	3	9	35
1961	65	50	6	9	35
1962	64	48	7	9	36
1963	66	41	14	11	34
1964	66	37	19	9	34
1965	65	33	21	11	35
1966	64	33	19	12	36
1967	62	35	14	13	38
1968	61	35	13	13	39
1969	58	34	11	13	42
1970	57	33	10	14	43
1971	56	32	9	15	44
1972	55	32	8	15	45
1973	53	31	7	15	47
1974	51	28	7	16	49
1975	51	27	7	17	49
1976	51	26	8	17	49
1977	50	25	7	18	50
1978	50	24	7	19	50
1979 (prelim.)	49	23	7	19	51
1980 (est.)	48	23	8	18	52
1981 (est.)	47	23	7	17	53

Note: Detail may not add to 100 because of rounding.
SOURCE: National Science Foundation.

Table 14. Full-time-equivalent (FTE) scientists and engineers employed in research and development by sector: selected years[1]

[In thousands]

Sector	1954	1961	1965	1969	1972	1975	1976	1977	1978	1979	1980[2]	1981[2]
Total	237.1	425.7	494.5	555.2	518.3	533.1	546.3	570.4	594.3	620.2	643.5	670.0
Federal Government[3]	37.7	51.1	61.8	68.5	64.4	63.4	64.0	64.7	66.3	67.0	67.5	68.0
Industry[4,5]	164.1	312.0	348.4	385.6	353.9	363.8	373.6	393.2	412.4	432.8	453.4	476.8
Universities and colleges, total	25.0	42.4	53.4	68.3	66.5	70.2	71.8	74.5	76.5	78.2	79.9	82.2
Scientists and engineers	20.3	33.6	40.4	50.4	48.9	51.6	52.9	54.4	55.9	56.5	57.1	58.3
Graduate students[6]	4.7	8.8	13.0	17.9	17.6	18.6	18.9	20.1	20.6	21.7	22.8	23.9
University-associated FFRDC's, total	5.0	9.1	11.1	11.6	11.7	12.7	13.4	14.0	14.1	14.7	15.2	15.5
Scientists and engineers	4.9	8.8	10.7	11.1	11.3	12.3	13.0	13.6	13.7	14.3	14.8	15.1
Graduate students[6]	.1	.3	.4	.5	.4	.4	.4	.4	.4	.4	.4	.4
Other nonprofit institutions[4]	5.3	11.1	19.9	21.2	21.8	23.0	23.5	24.0	25.0	27.5	27.5	27.5

[1] Number of full-time employees plus the FTE of part-time employees. Excludes scientists and engineers employed in State and local government agencies. Totals may be understated by about 5 percent because of incomplete data on summer employment at universities and colleges.

[2] Estimate.

[3] Includes both civilian and military service personnel and managers of R&D.

[4] Includes professional R&D personnel employed at FFRDC's administered by organizations in the sector.

[5] Excludes social scientists.

[6] Numbers of FTE graduate students receiving stipends and engaged in R&D.

NOTE: The figures for the industry sector represent yearly averages and may differ from other data in the text which is based upon surveys reporting the employment in a single month of the year.

SOURCE: National Science Foundation

Table 15. National expenditures for performance of R&D as a percent of gross national product (GNP) by source: 1961-81

Year	Total	Federal	Nonfederal
1961	2.73	1.76	.97
1962	2.72	1.75	.97
1963	2.86	1.88	.98
1964	2.96	1.97	.99
1965	2.90	1.88	1.02
1966	2.89	1.85	1.04
1967	2.89	1.80	1.09
1968	2.82	1.71	1.11
1969	2.72	1.58	1.14
1970	2.63	1.49	1.14
1971	2.47	1.39	1.08
1972	2.40	1.33	1.07
1973	2.31	1.23	1.08
1974	2.29	1.17	1.12
1975	2.27	1.17	1.10
1976	2.27	1.15	1.12
1977	2.24	1.13	1.11
1978	2.23	1.11	1.12
1979 (prelim)	2.25	1.10	1.15
1980 (est)	2.33	1.12	1.21
1981 (est)	2.37	1.12	1.25

SOURCES: National Science Foundation and Department of Commerce

Table 16. R&D scientists and engineers and employed civilian labor force: selected years

[In thousands]

Year	R&D scientists and engineers	Employed civilian labor force
1967	530.0	74,372
1969	555.2	77,902
1971	526.6	79,120
1973	518.4	84,409
1975	533.1	84,783
1977	570.4	90,546
1979 (prelim)	620.2	96,945
1981 (est)	670.0	98,500

SOURCES: National Science Foundation and Department of Labor

Table 17. National expenditures for performance of R&D as a percent of gross national product (GNP) by country: 1967-79

Year	France	West Germany	Japan	United Kingdom	United States	U.S.S.R.
1967	2.13	1.97	1.53	2.30	2.89	2.91
1968	2.08	1.97	1.61	2.27	2.82	NA
1969	1.94	2.05	1.65	2.22	2.72	3.03
1970	1.91	2.18	1.79	NA	2.63	3.23
1971	1.90	2.38	1.84	NA	2.47	3.29
1972	1.86	2.33	1.85	2.06	2.40	3.58
1973	1.76	2.22	1.89	NA	2.31	3.66
1974	1.79	2.26	1.95	NA	2.29	3.64
1975	1.80	2.38	1.94	2.05	2.27	3.69
1976	1.77	2.29	1.93	NA	2.27	3.55
1977	1.76	2.32	1.92	NA	2.24	3.46
1978	1.76	2.37	1.93	2.11	2.23	3.47
1979	NA	2.36	NA	NA	2.25	3.44

NA = Not available.

SOURCES: National Science Foundation, Organization for Economic Cooperation and Development and Dr. Robert Campbell (Indiana University)

Table 18. Scientists and engineers[1] engaged in R&D per 10,000 labor force population by country: 1967-79

Year	France	West Germany	Japan	United Kingdom	United States	U.S.S.R.	
						Low estimate	High estimate
1967	25.3	24.9	27.8	NA	66.1	50.7	55.3
1968	26.4	26.2	31.1	20.8	66.9	53.5	58.8
1969	27.2	28.4	30.8	NA	65.9	56.5	62.1
1970	27.3	30.9	33.4	NA	63.6	58.4	64.2
1971	27.8	33.8	37.5	NA	60.6	63.0	69.1
1972	28.1	36.0	38.1	30.4	58.2	66.5	73.2
1973	28.4	37.8	42.5	NA	56.9	73.5	81.5
1974	28.8	39.1	44.9	NA	56.3	74.5	82.9
1975	29.3	41.0	47.9	31.3	56.4	78.2	87.5
1976	29.9	41.7	48.4	NA	56.7	80.7	90.9
1977	30.3	44.3	49.9	NA	57.7	81.3	91.5
1978	NA	NA	49.4	NA	58.3	82.9	93.3
1979	NA	NA	NA	NA	59.2	84.2	94.9

[1] Includes all scientists and engineers engaged in R&D on a full-time-equivalent basis (except Japan whose data include persons primarily employed in R&D and the United Kingdom whose data include only the government and industry sectors).

NA = Not available.

SOURCES: National Science Foundation, U.S. Department of Labor, Organization for Economic Cooperation and Development, and Dr. Robert Campbell (Indiana University)

Table 19. Estimated ratio of civilian R&D expenditures[1] to gross national product (GNP) for selected countries: 1967-79

Year	France	West Germany	Japan	United Kingdom	United States
1967	1.50	1.70	1.52	1.65	1.48
1968	1.54	1.72	1.59	1.66	1.46
1969	1.52	1.81	1.64	1.66	1.49
1970	1.47	1.96	1.77	NA	1.50
1971	1.33	2.16	1.81	NA	1.46
1972	1.35	2.13	1.81	1.48	1.44
1973	1.30	2.01	1.85	NA	1.43
1974	1.36	2.07	1.91	NA	1.49
1975	1.39	2.19	1.89	1.39	1.50
1976	1.38	2.09	1.88	NA	1.50
1977	1.38	2.14	1.87	NA	1.52
1978	1.35	2.19	NA	1.47	1.54
1979	NA	2.18	NA	NA	1.57

[1] National R&D expenditures, excluding government funds for defense and space.

NA = Not available.

SOURCES: National Science Foundation and Organization for Economic Cooperation and Development

TABLE 20. FEDERAL OUTLAYS FOR RESEARCH, DEVELOPMENT, AND R&D PLANT, BY AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES	
									1980	1981
TOTAL, ALL AGENCIES ..	16,727,350	17,489,075	18,297,474	19,551,253	21,021,304	23,379,664	25,679,600	27,842,827	31,661,076	34,891,622
DEPT OF AGRIC, TOTAL .	357,859	357,068	381,452	425,641	468,843	537,766	572,359	630,474	690,763	705,221
FOREST SERVICE	56,546	58,286	65,617	72,488	90,277	92,533	86,708	105,700	115,200	118,300
SCI & ED ADMIN 1/...	282,671	281,770	295,878	328,436	351,656	414,738	453,251	487,751	531,295	531,573
AGRIC RESEARCH ...	208,717	199,349	210,547	232,781	247,441	294,580	318,401	331,158	347,135	341,335
AGRIC COOPERATIVE RESEARCH	73,657	82,147	85,162	95,579	104,196	120,158	134,850	156,593	184,160	190,238
TECH INFORMATION SYSTEMS	297	274	169	76	19	-	-	-	-	-
OTHER AGRICULTURE ..	18,642	17,012	19,957	24,717	26,910	30,495	32,400	37,023	44,268	55,348
DEPT OF COMMERCE, TOTAL	168,209	186,193	188,202	224,592	233,316	238,188	272,678	307,094	349,422	363,343
NATIONAL BUREAU OF STANDARDS	34,747	36,846	42,464	47,165	49,107	53,128	59,002	64,758	74,464	82,015
NATIONAL OCEANIC & ATMOS ADMIN	109,667	114,420	109,488	127,683	134,457	132,609	164,733	190,110	215,870	225,772
OTHER COMMERCE	23,795	34,927	36,250	49,738	49,752	52,451	48,943	52,226	59,088	55,556
DEPT OF DEFENSE, TOTAL	8,297,162	8,597,649	8,979,742	9,363,517	9,445,510	10,307,977	10,935,419	11,733,102	13,175,030	15,627,732
ARMY	1,889,811	2,042,439	2,308,602	2,083,044	1,969,575	2,195,044	2,464,318	2,536,219	2,809,930	3,148,137
NAVY	2,501,480	2,498,936	2,715,822	3,126,263	3,320,098	3,582,569	3,919,368	3,926,432	4,404,700	4,811,388
AIR FORCE	3,426,186	3,588,512	3,442,302	3,567,555	3,625,220	3,902,173	3,969,911	4,427,950	4,968,761	6,454,270
DEFENSE AGENCIES ...	475,705	461,310	485,162	556,858	507,500	610,460	555,057	814,181	959,639	1,175,937
OTHER DEFENSE	3,980	6,452	27,854	29,797	23,117	17,731	26,765	28,320	32,000	38,000
DEPT OF EDUCATION 2/..	108,023	138,014	163,218	136,371	128,067	91,609	101,781	136,476	145,549	147,225
DEPT OF ENERGY 3/.....	1,551,266	1,624,370	1,824,987	2,246,625	2,553,700	3,593,121	4,413,005	4,956,800	5,776,203	5,904,438

TABLE 20. FEDERAL OUTLAYS FOR RESEARCH, DEVELOPMENT, AND R&D PLANT, BY AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

- CONTINUED

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES	
									1980	1981
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 4/	1,446,444	1,711,603	1,744,365	1,984,604	2,425,592	2,450,600	2,893,180	3,172,700	3,468,536	3,649,280
NAT'L INST OF HEALTH	1,112,067	1,373,688	1,435,422	1,684,363	2,118,384	2,104,983	2,507,105	2,713,447	2,948,238	3,083,140
OTHER HHS	334,377	366,683	361,936	347,467	368,579	425,631	461,349	459,253	520,298	566,140
DEPT OF HOUSING & URBAN DEV	50,090	47,763	58,382	58,737	60,274	68,981	59,269	74,324	66,063	64,233
DEPT OF THE INTERIOR, TOTAL	212,988	254,143	194,817	265,994	319,748	303,953	339,932	404,277	413,858	432,839
BUREAU OF MINES	66,171	68,553	66,705	82,681	113,700	103,675	104,180	121,378	108,002	111,362
GEOLOGICAL SURVEY ..	50,193	62,741	68,671	95,176	115,664	112,205	128,711	144,157	146,598	151,651
OTHER INTERIOR	96,624	122,849	59,441	88,137	90,384	88,073	107,041	138,742	159,258	169,826
DEPT OF JUSTICE	11,901	22,177	40,490	43,809	39,918	33,709	33,457	45,878	48,102	59,955
DEPT OF LABOR	23,048	18,334	22,477	25,358	27,814	28,062	97,629	109,170	167,726	216,923
DEPT OF STATE	550	1,489	1,551	1,237	1,611	2,280	2,848	3,168	2,766	2,669
DEPT OF TRANS, TOTAL .	287,029	337,287	363,738	339,191	335,700	363,504	377,250	372,362	364,700	358,970
FEDL AVIATION ADMIN	107,066	88,627	115,846	113,681	114,600	102,800	100,200	111,400	106,400	112,300
OTHER TRANSPORTATION	179,963	248,660	247,892	225,510	221,100	260,704	277,050	260,962	258,300	246,670
DEPT OF THE TREASURY .	1,266	1,013	1,139	1,689	3,842	5,015	9,901	9,581	12,523	11,932

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TABLE 20. FEDERAL OUTLAYS FOR RESEARCH, DEVELOPMENT, AND R&D PLANT, BY AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

- CONTINUED

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
OTHER AGENCIES										
ENVIRON'L PROTECTION AGENCY	133,821	147,668	172,242	218,567	265,620	282,950	312,514	388,867	435,100	465,200
NATIONAL AERONAUTICS & SPACE ADMIN	3,422,862	3,315,163	3,256,216	3,266,491	3,669,022	3,945,311	3,983,119	4,196,472	5,002,600	5,215,700
NAT'L SCI FOUNDATION .	435,000	470,941	584,711	600,400	669,100	674,700	738,566	804,561	869,956	940,800
NUCLEAR REGULATORY COMMISSION	-	-	46,148	58,458	76,879	107,823	131,690	145,422	188,553	210,882
VETERANS ADMIN	76,084	82,793	85,715	97,026	109,504	112,822	123,931	123,128	134,148	142,370
ALL OTHER	143,748	146,639	134,889	145,720	125,873	151,279	205,798	225,973	349,478	372,110

1/ THE SCIENCE AND EDUCATION ADMINISTRATION WAS ESTABLISHED IN FY, 1977.

2/ DEPARTMENT OF EDUCATION DATA SHOWN FOR 1972-78 ARE COMPOSED OF DATA FOR THE OFFICE OF EDUCATION, THE NATIONAL INSTITUTE OF EDUCATION, AND THE ASSISTANT SECRETARY FOR EDUCATION OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW).

3/ THE DEPARTMENT OF ENERGY WAS ESTABLISHED IN FY 1977; DATA SHOWN FOR 1972-73 ARE ATOMIC ENERGY COMMISSION AMOUNTS, AND DATA SHOWN FOR 1974-76 ARE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION AMOUNTS.

4/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE HEW AMOUNTS MINUS EDUCATION PROGRAMS.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 21. FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT, BY AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL, ALL AGENCIES ..	16,496,165	16,800,427	17,410,504	19,039,235	20,780,103	23,983,508	26,388,002	28,978,377	31,878,185	35,492,134
DEPT OF AGRIC, TOTAL .	349,573	366,522	378,706	420,082	462,449	546,963	621,282	663,025	731,742	777,518
FOREST SERVICE	55,153	58,442	65,496	78,181	79,901	90,262	105,617	107,500	112,100	124,100
SCI & ED ADMIN 1/...	276,610	289,220	293,108	318,271	355,508	426,211	482,965	518,393	575,374	597,965
AGRIC RESEARCH ...	193,798	199,539	203,544	217,124	242,111	298,946	325,541	345,836	389,305	403,340
AGRIC COOPERATIVE RESEARCH	82,584	89,406	89,421	101,141	113,389	127,265	157,424	172,557	186,069	194,628
TECH INFORMATION SYSTEMS	228	275	143	6	8	-	-	-	-	-
OTHER AGRICULTURE ..	17,810	18,860	20,102	23,630	27,040	30,490	32,700	37,132	44,268	55,448
DEPT OF COMMERCE, TOTAL	187,259	190,600	180,585	215,382	228,853	244,721	283,665	309,359	338,336	372,573
NATIONAL BUREAU OF STANDARDS	34,740	36,840	40,210	43,156	47,444	53,223	58,308	67,800	76,100	79,100
NATIONAL OCEANIC & ATMOS ADMIN	115,157	115,614	109,090	128,017	135,094	145,692	161,450	171,176	190,215	219,687
OTHER COMMERCE	37,362	38,146	31,285	44,209	46,315	45,806	63,909	70,383	72,021	73,786
DEPT OF DEFENSE, TOTAL	8,318,145	8,404,214	8,420,386	9,012,472	9,654,722	10,963,351	11,553,638	12,506,225	13,787,691	16,604,408
ARMY	2,064,179	2,013,569	2,009,862	1,896,742	2,013,653	2,441,866	2,548,927	2,768,674	2,951,892	3,363,921
NAVY	2,519,364	2,654,754	2,718,520	3,100,165	3,328,005	3,817,410	3,998,416	4,335,042	4,809,628	4,891,324
AIR FORCE	3,254,278	3,273,543	3,216,215	3,513,495	3,726,627	4,031,095	4,262,349	4,525,616	5,021,849	7,059,908
DEFENSE AGENCIES ...	476,362	434,081	448,881	478,537	561,647	641,441	707,886	847,583	971,722	1,247,055
OTHER DEFENSE	3,962	28,267	26,908	25,533	24,790	31,539	36,060	29,310	32,600	42,200
DEPT OF EDUCATION 2/..	130,068	165,120	127,218	116,277	122,962	97,006	123,772	166,288	153,143	164,141
DEPT OF ENERGY 3/.....	1,297,668	1,363,196	1,488,903	2,047,306	2,463,809	3,536,220	4,244,827	4,638,766	4,949,695	4,994,781

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TABLE 21. FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT, BY AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

- CONTINUED

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 4/	1,621,044	1,643,690	2,109,903	2,216,841	2,398,727	2,649,502	3,007,641	3,504,880	3,776,871	3,907,538
NAT'L INST OF HEALTH	1,271,300	1,314,198	1,736,784	1,879,872	2,060,247	2,279,859	2,580,862	2,953,133	3,161,621	3,272,855
OTHER HHS	349,744	358,260	426,112	401,309	400,354	446,432	502,620	551,747	615,250	634,683
DEPT OF HOUSING & URBAN DEV	49,090	57,829	64,777	62,028	67,575	52,104	69,723	67,915	61,464	64,085
DEPT OF THE INTERIOR, TOTAL	218,722	243,746	192,427	303,329	333,198	314,682	358,974	405,778	425,573	424,989
BUREAU OF MINES	70,888	77,507	66,107	107,627	131,300	101,914	113,968	121,004	116,737	108,976
GEOLOGICAL SURVEY ..	51,535	66,596	66,234	106,616	110,324	117,468	133,656	145,571	153,185	151,478
OTHER INTERIOR	96,299	99,643	60,086	89,086	91,574	95,300	111,350	139,203	155,651	164,535
DEPT OF JUSTICE	23,379	33,199	34,684	44,330	33,859	27,650	60,919	42,991	47,637	42,642
DEPT OF LABOR	23,118	19,943	23,775	25,376	28,533	29,565	97,835	136,977	163,968	192,814
DEPT OF STATE	550	1,489	1,463	1,237	1,611	2,280	2,843	3,168	2,766	2,669
DEPT OF TRANS, TOTAL .	310,505	310,640	369,789	311,563	294,500	354,604	408,250	370,089	362,199	378,320
FEDL AVIATION ADMIN	100,878	79,455	125,013	105,578	98,100	103,400	110,500	110,500	103,100	115,100
OTHER TRANSPORTATION	209,627	231,185	244,776	205,985	196,400	251,204	297,750	259,589	259,099	263,220
DEPT OF THE TREASURY .	1,251	1,000	1,125	1,665	3,735	4,805	9,878	9,541	12,483	11,882

TABLE 21. FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT, BY AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

- CONTINUED

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
OTHER AGENCIES										
ENVIRON'L PROTECTION AGENCY	122,350	180,592	169,213	257,657	259,138	295,450	384,636	410,100	414,800	444,900
NATIONAL AERONAUTICS & SPACE ADMIN	3,157,237	3,060,887	3,002,172	3,064,413	3,446,830	3,703,385	3,875,414	4,411,008	5,113,686	5,397,654
NAT'L SCI FOUNDATION .	454,840	479,893	556,413	595,021	609,256	697,019	748,775	807,925	904,331	994,770
NUCLEAR REGULATORY COMMISSION	-	-	42,338	64,155	88,432	112,291	133,891	148,772	196,325	217,928
VETERANS ADMIN	69,087	74,271	84,805	94,807	97,679	107,001	113,991	127,004	130,747	133,683
ALL OTHER	162,279	174,828	108,829	120,954	122,361	168,120	212,202	248,566	304,728	364,841

1/ THE SCIENCE AND EDUCATION ADMINISTRATION WAS ESTABLISHED IN FY 1977.

2/ DEPARTMENT OF EDUCATION DATA SHOWN FOR 1972-78 ARE COMPOSED OF DATA FOR THE OFFICE OF EDUCATION, THE NATIONAL INSTITUTE OF EDUCATION, AND THE ASSISTANT SECRETARY FOR EDUCATION OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW).

3/ THE DEPARTMENT OF ENERGY WAS ESTABLISHED IN FY 1977; DATA SHOWN FOR 1972-73 ARE ATOMIC ENERGY COMMISSION AMOUNTS, AND DATA SHOWN FOR 1974-76 ARE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION AMOUNTS.

4/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE HEW AMOUNTS MINUS EDUCATION PROGRAMS.

SOURCE: NATIONAL SCIENCE FOUNDATION

Table 22. Federal R&D funding by budget function:[1] fiscal years 1972-81

[Dollars in millions]

Function	Actual								Estimates	
	1972	1973	1974	1975	1976	1977	1978	1979	1980[2]	1981[2]
Total	16,496	16,800	17,411	19,039	20,780	23,984	26,517	29,040	31,845	35,528
National defense	8,902	9,002	9,016	9,679	10,430	11,864	12,899	13,791	14,959	18,117
Space research and technology	2,932	2,824	2,702	2,764	3,130	3,365	3,481	3,969	4,606	4,918
Health	1,547	1,585	2,069	2,170	2,351	2,629	2,968	3,401	3,650	3,792
Energy	574	630	759	1,363	1,649	2,562	3,134	3,461	3,765	3,675
General science	625	658	749	813	858	974	1,050	1,119	1,246	1,371
Natural resources and environment	479	554	516	624	683	753	904	1,010	1,090	1,140
Transportation	559	572	694	635	631	709	768	799	860	876
Agriculture	294	308	313	342	383	457	501	552	602	634
Education, training, employment, and social services	235	290	236	239	255	230	345	354	457	341
Community and regional development	66	78	82	93	109	101	92	127	118	137
International affairs	29	28	24	29	42	66	57	117	127	135
Veterans benefits and services	69	74	85	95	98	107	111	123	126	130
Commerce and housing credit	50	50	51	65	69	71	77	92	107	114
Income security	106	106	71	72	48	55	67	57	63	80
Administration of justice	23	33	35	44	35	30	44	47	48	46
General government	8	7	9	12	12	13	18	23	21	23

[1] Listed in descending order of 1981 budget authority. Data for 1972-77 are shown in obligations; data for 1978-81 are shown in budget authority.

[2] Estimates for 1980 and 1981 are based on the 1981 revised budget.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation

TABLE 23. FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT BY CHARACTER OF WORK: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

FISCAL YEAR	TOTAL R&D	RESEARCH		DEVELOPMENT
		BASIC	APPLIED	
1972	16,496,165	2,164,595	3,426,186	10,905,384
1973	16,800,427	2,192,808	3,453,524	11,154,095
1974	17,410,504	2,339,138	3,876,716	11,194,650
1975	19,039,235	2,535,833	4,305,470	12,197,932
1976	20,780,103	2,700,282	4,915,273	13,164,548
1977	23,983,508	3,191,069	5,412,633	15,379,806
1978	26,388,002	3,619,328	6,105,296	16,663,378
1979	28,978,377	4,097,311	6,575,859	18,305,207
1980 (ESTIMATED)	31,878,185	4,508,578	7,294,523	20,075,084
1981 (ESTIMATED)	35,492,134	4,901,856	8,006,436	22,583,842

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 24. FEDERAL OBLIGATIONS FOR RESEARCH AND DEVELOPMENT, BY PERFORMER: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

PERFORMER	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL	16,496,165	16,800,427	17,410,504	19,039,235	20,780,103	23,983,508	26,388,002	28,978,377	31,878,185	35,492,134
FEDERAL INTRAMURAL 1/.	4,542,113	4,709,113	4,861,146	5,310,368	5,687,952	6,053,231	6,855,772	7,496,588	8,051,693	8,965,190
INDUSTRIAL FIRMS 2/...	8,293,854	8,367,234	8,391,969	9,171,586	10,246,756	12,297,952	13,128,330	14,218,352	15,946,667	18,086,820
UNIVS & COLLEGES	1,902,174	1,915,544	2,214,508	2,408,374	2,541,537	2,905,439	3,364,796	3,888,077	4,207,494	4,555,721
FFRDC'S ADMIN BY UNIV & COL	760,559	725,310	789,136	935,076	1,061,115	1,326,809	1,325,629	1,510,999	1,621,908	1,734,402
NONPROFIT INSTS 2/....	731,149	762,028	874,323	924,639	938,479	1,073,848	1,321,897	1,399,578	1,478,988	1,560,356
STATE & LOCAL GOV	206,706	256,841	214,369	227,618	231,165	238,044	268,410	310,121	385,748	406,815
FOREIGN	59,610	64,357	65,053	61,576	73,099	88,185	123,168	154,662	185,687	182,830

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

2/ INCLUDES FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC'S) ADMINISTERED BY THIS SECTOR.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 25. FEDERAL OBLIGATIONS FOR RESEARCH BY SELECTED AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL, ALL AGENCIES ..	5,590,781	5,646,332	6,215,854	6,841,303	7,615,555	8,603,702	9,724,624	10,673,170	11,803,101	12,908,292
DEPT OF AGRICULTURE ..	337,169	354,106	365,064	401,944	442,224	524,020	594,484	631,920	697,442	742,330
DEPT OF COMMERCE	143,394	130,155	129,189	144,420	155,713	176,129	192,775	219,458	244,530	269,653
DEPT OF DEFENSE, TOTAL	1,547,369	1,500,708	1,474,646	1,542,185	1,523,259	1,804,897	1,941,213	2,151,632	2,434,495	2,960,279
ARMY	350,964	361,949	348,741	335,668	306,425	433,415	414,300	462,212	534,045	713,195
NAVY	303,190	284,098	292,938	302,730	314,900	377,967	402,000	432,800	496,000	599,100
AIR FORCE	508,900	522,996	508,036	571,485	557,100	598,800	685,727	750,700	808,300	897,100
DEFENSE AGENCIES ...	380,353	328,474	322,239	330,634	344,134	393,415	431,686	505,920	596,150	750,884
OTHER DEFENSE	3,962	3,191	2,692	1,668	700	1,300	7,500			
DEPT OF EDUCATION 1/..	36,048	22,766	15,961	9,884	33,263	40,049	49,243	93,392	89,462	100,213
DEPT OF ENERGY 2/.....	417,122	424,784	464,748	593,431	746,499	891,266	1,102,243	1,131,846	1,269,664	1,424,970
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 3/	1,395,980	1,411,370	1,813,553	1,907,869	2,082,846	2,325,520	2,646,313	3,015,669	3,282,519	3,431,097
NAT'L INST OF HEALTH	1,099,350	1,132,050	1,489,640	1,604,217	1,767,692	1,968,658	2,232,596	2,530,111	2,743,798	2,856,012
OTHER HHS	296,630	289,383	341,071	310,729	349,778	405,573	458,878	485,558	538,721	575,085
DEPT OF HOUSING & URBAN DEV	12,660	18,376	33,790	33,495	36,945	32,720	30,535	23,770	23,370	25,776
DEPT OF THE INTERIOR .	147,313	160,161	143,498	234,053	259,458	255,942	283,492	339,468	362,706	366,016
DEPT OF STATE	550	750	1,051	743	1,121	2,065	2,478	2,694	2,366	2,269
DEPT OF TRANSPORTATION	98,183	77,236	61,781	53,844	31,100	51,760	66,500	66,983	70,352	84,100

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TABLE 25. FEDERAL OBLIGATIONS FOR RESEARCH BY SELECTED AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

- CONTINUED

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
OTHER AGENCIES										
ENVIRON'L PROTECTION AGENCY	51,068	74,287	96,294	141,711	155,395	205,252	252,670	259,000	258,500	285,200
NATIONAL AERONAUTICS & SPACE ADMIN	764,592	793,920	845,667	935,139	1,222,841	1,206,076	1,345,167	1,451,236	1,614,674	1,600,864
NAT'L SCI FOUNDATION .	427,270	463,953	520,256	570,015	595,776	688,300	743,502	800,025	895,331	983,770
NUCLEAR REGULATORY COMMISSION	-	-	42,338	64,155	88,432	112,291	133,891	148,772	196,325	217,928
VETERANS ADMIN	67,057	69,730	78,728	87,140	85,127	92,342	99,400	111,362	112,454	115,383
ALL OTHER	145,006	133,967	112,112	114,198	120,932	146,362	195,557	225,943	248,911	298,444

1/ DEPARTMENT OF EDUCATION DATA SHOWN FOR 1972-78 ARE COMPOSED OF DATA FOR THE OFFICE OF EDUCATION, THE NATIONAL INSTITUTE OF EDUCATION, AND THE ASSISTANT SECRETARY FOR EDUCATION OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW).

2/ THE DEPARTMENT OF ENERGY WAS ESTABLISHED IN FY 1977; DATA SHOWN FOR 1972-73 ARE ATOMIC ENERGY COMMISSION AMOUNTS, AND DATA SHOWN FOR 1974-76 ARE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION AMOUNTS.

3/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE HEW AMOUNTS MINUS EDUCATION PROGRAMS.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 26. FEDERAL OBLIGATIONS FOR RESEARCH, BY PERFORMER: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

PERFORMER	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL	5,590,781	5,646,332	6,215,854	6,841,303	7,615,555	8,603,702	9,724,624	10,673,170	11,803,101	12,908,292
FEDERAL INTRAMURAL 1/.	1,938,307	2,056,954	2,220,679	2,438,987	2,782,612	2,928,913	3,190,653	3,450,849	3,712,547	3,977,677
INDUSTRIAL FIRMS 2/...	1,069,334	1,050,645	1,058,241	1,274,024	1,369,712	1,666,002	2,027,914	2,172,193	2,541,535	2,893,087
UNIVS & COLLEGES	1,642,155	1,690,569	1,959,962	2,083,112	2,253,210	2,589,263	2,932,560	3,340,401	3,666,825	3,989,600
FFRDC'S ADMIN BY UNIV & COL	398,441	355,166	373,966	425,512	548,278	670,304	714,850	800,601	882,732	987,075
NONPROFIT INSTS 2/....	404,251	368,722	467,937	463,457	491,985	573,722	659,896	692,255	738,817	780,362
STATE & LOCAL GOV	93,771	84,289	91,024	111,907	119,371	115,177	128,827	139,466	168,725	177,519
FOREIGN	44,522	39,987	44,045	44,304	50,387	60,321	69,924	77,405	91,920	102,972

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

2/ INCLUDES FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC'S) ADMINISTERED BY THIS SECTOR.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 27. FEDERAL OBLIGATIONS FOR RESEARCH, BY FIELD OF SCIENCE: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

FIELD OF SCIENCE	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL, ALL FIELDS	5,590,781	5,646,332	6,215,854	6,841,303	7,615,555	8,603,702	9,724,624	10,673,170	11,803,101	12,908,292
LIFE SCIENCES	1,846,784	1,928,840	2,265,196	2,462,099	2,639,396	3,016,038	3,430,134	3,850,471	4,1[illegible]6,548	4,431,975
PSYCHOLOGY	116,528	107,820	132,855	137,580	138,229	156,086	192,527	202,290	221,710	248,337
PHYSICAL SCIENCES	1,004,254	985,990	1,027,808	1,118,661	1,266,222	1,559,518	1,680,180	1,821,540	1,980,374	2,262,536
ENVIRONMENTAL SCIENCES	567,407	585,407	633,144	730,872	765,562	908,410	1,028,039	1,103,382	1,249,932	1,328,531
MATH & COMPUTER SCI ..	145,522	133,144	136,312	151,378	167,235	210,735	234,714	257,301	282,343	353,345
ENGINEERING	1,460,031	1,412,728	1,575,088	1,765,455	2,067,737	2,124,718	2,445,914	2,622,889	2,963,252	3,245,798
SOCIAL SCIENCES	305,693	297,825	291,176	302,198	392,755	448,689	506,876	527,873	560,169	601,729
OTHER SCIENCES, NEC ..	144,562	194,778	154,275	173,060	178,419	179,508	206,240	287,424	358,773	436,071

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 28. FEDERAL OBLIGATIONS FOR BASIC RESEARCH BY AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL, ALL AGENCIES ..	2,164,595	2,192,808	2,339,138	2,535,833	2,700,282	3,191,069	3,619,328	4,097,311	4,508,578	4,901,856
DEPT OF AGRICULTURE ..	137,311	142,726	145,611	154,184	171,371	204,450	242,704	256,420	287,991	323,563
DEPT OF COMMERCE	44,024	16,313	18,189	20,065	22,274	23,159	23,861	24,751	28,960	32,172
DEPT OF DEFENSE, TOTAL	270,336	257,844	243,892	235,515	248,440	294,826	319,079	363,322	430,321	515,390
ARMY	55,784	44,673	48,006	37,281	39,040	58,552	54,530	59,482	73,920	107,790
NAVY	92,600	83,631	83,250	88,117	95,900	115,328	130,300	147,700	167,000	194,800
AIR FORCE	86,600	92,296	77,736	79,385	81,600	85,300	95,100	96,800	110,000	125,300
DEFENSE AGENCIES ...	35,352	37,244	34,900	30,732	31,900	35,646	39,149	59,340	79,401	87,500
DEPT OF EDUCATION 1/..	3,707	11,449	4,966	1,894	5,081	11,880	18,276	20,567	22,042	26,170
DEPT OF ENERGY 2/.....	268,289	275,156	289,504	31[illegible],758	345,790	389,450	440,534	462,968	520,277	581,831
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 3/	661,655	655,899	845,099	901,853	981,091	1,105,437	1,271,840	1,576,011	1,698,590	1,788,099
NAT'L INST OF HEALTH	585,700	592,966	775,300	828,520	920,312	1,032,776	1,181,094	1,463,703	1,579,493	1,657,087
OTHER HHS	75,955	62,933	69,799	73,333	60,779	74,839	92,969	112,308	119,097	131,012
DEPT OF THE INTERIOR .	43,052	48,741	48,681	54,944	54,330	63,579	65,876	72,522	76,121	77,024
DEPT OF TRANSPORTATION	535	166	275	75	-	-	-	-	-	-

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TABLE 28. FEDERAL OBLIGATIONS FOR BASIC RESEARCH BY AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

- CONTINUED

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
OTHER AGENCIES										
ENVIRON'L PROTECTION AGENCY	6,118	9,030	9,500	17,400	13,700	8,296	6,010	10,100	13,500	18,500
NATIONAL AERONAUTICS & SPACE ADMIN	331,611	350,279	305,857	309,335	293,209	413,774	479,729	512,847	537,839	544,689
NAT'L SCI FOUNDATION .	367,691	392,442	415,217	485,989	523,634	624,900	678,040	733,255	820,861	906,320
SMITHSONIAN INST	21,271	24,041	24,713	24,785	25,735	29,651	34,896	36,901	41,025	45,221
VETERANS ADMIN	3,150	3,195	3,560	3,880	8,900	9,095	8,891	9,523	10,231	10,247
ALL OTHER	5,845	5,527	4,074	13,156	6,727	10,394	27,369	18,124	20,820	32,830

1/ DEPARTMENT OF EDUCATION DATA SHOWN FOR 1972-78 ARE COMPOSED OF DATA FOR THE OFFICE OF EDUCATION, THE NATIONAL INSTITUTE OF EDUCATION, AND THE ASSISTANT SECRETARY FOR EDUCATION OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW).

2/ THE DEPARTMENT OF ENERGY WAS ESTABLISHED IN FY 1977; DATA SHOWN FOR 1972-73 ARE ATOMIC ENERGY COMMISSION AMOUNTS, AND DATA SHOWN FOR 1974-76 ARE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION AMOUNTS.

3/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE HEW AMOUNTS MINUS EDUCATION PROGRAMS.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 29. FEDERAL OBLIGATIONS FOR BASIC RESEARCH, BY PERFORMER: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

PERFORMER	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL	2,164,595	2,192,808	2,339,138	2,535,833	2,700,282	3,191,069	3,619,328	4,097,311	4,508,578	4,901,856
FEDERAL INTRAMURAL 1/.	584,249	585,986	663,969	700,846	738,113	866,599	972,697	1,026,184	1,096,400	1,172,397
INDUSTRIAL FIRMS 2/...	175,876	209,144	147,684	157,082	181,998	252,395	303,203	333,367	371,701	402,964
UNIVS & COLLEGES	1,017,668	1,039,113	1,137,253	1,250,975	1,333,718	1,544,433	1,748,635	2,065,652	2,288,242	2,521,534
FFRDC'S ADMIN BY UNIV & COL	254,485	228,984	223,098	257,548	284,884	324,119	356,772	393,607	444,503	480,071
NONPROFIT INSTS 2/....	103,248	100,237	131,982	141,045	132,028	167,523	196,347	239,227	257,272	269,742
STATE & LOCAL GOV	17,398	16,194	16,812	14,009	12,914	15,603	17,050	19,758	21,762	23,458
FOREIGN	11,671	13,150	18,340	14,328	16,627	20,397	24,624	19,516	28,898	31,890

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

2/ INCLUDES FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC'S) ADMINISTERED BY THIS SECTOR.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 30. FEDERAL OBLIGATIONS FOR BASIC RESEARCH, BY FIELD OF SCIENCE: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

FIELD OF SCIENCE	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL, ALL FIELDS	2,164,595	2,192,808	2,339,138	2,535,833	2,700,282	3,191,069	3,619,328	4,097,311	4,508,578	4,901,856
LIFE SCIENCES	870,088	874,704	1,021,573	1,104,029	1,206,255	1,372,140	1,572,399	1,870,645	2,035,338	2,175,990
PSYCHOLOGY	52,360	45,785	47,890	58,591	42,652	53,518	80,443	71,133	77,522	85,786
PHYSICAL SCIENCES	617,917	611,714	632,718	691,645	710,128	864,508	917,346	1,021,515	1,122,724	1,226,621
ENVIRONMENTAL SCIENCES	279,331	283,616	297,718	287,729	299,651	394,873	454,317	463,279	509,212	530,488
MATH & COMPUTER SCI ..	62,819	56,771	48,463	57,771	69,320	78,871	91,047	96,111	108,415	129,908
ENGINEERING	186,514	205,863	191,787	236,857	242,862	306,242	344,181	395,097	443,471	520,679
SOCIAL SCIENCES	79,988	78,769	73,285	73,688	86,294	95,411	124,198	129,538	142,086	154,864
OTHER SCIENCES, NEC ..	15,578	35,586	25,704	25,523	43,120	25,506	35,397	49,993	69,810	77,520

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 31. FEDERAL OBLIGATIONS FOR APPLIED RESEARCH BY AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL, ALL AGENCIES ..	3,426,186	3,453,524	3,876,716	4,305,470	4,915,273	5,412,633	6,105,296	6,575,859	7,294,523	8,006,438
DEPT OF AGRICULTURE ..	199,858	211,380	219,453	247,760	270,853	319,570	351,780	375,500	409,451	418,767
DEPT OF COMMERCE	99,370	113,842	111,000	124,355	133,439	152,970	168,914	194,707	215,570	237,481
DEPT OF DEFENSE, TOTAL	1,277,033	1,242,864	1,230,754	1,306,670	1,274,819	1,510,071	1,622,134	1,788,310	2,004,174	2,444,889
ARMY	295,180	317,278	300,735	298,387	267,385	374,863	359,770	402,730	460,125	605,405
NAVY	210,590	200,467	209,688	214,613	219,000	262,639	271,700	285,100	329,000	404,300
AIR FORCE	422,300	430,700	430,300	492,100	475,500	513,500	590,627	653,900	698,300	771,800
DEFENSE AGENCIES ...	345,001	291,230	287,339	299,902	312,234	357,769	392,537	446,580	516,749	663,384
OTHER DEFENSE	3,962	3,191	2,692	1,668	700	1,300	7,500	-	-	-
DEPT OF EDUCATION 1/..	32,341	11,317	11,015	7,990	28,182	28,169	30,967	72,825	67,420	74,043
DEPT OF ENERGY 2/.....	148,833	149,628	195,244	280,673	400,709	501,816	661,709	668,878	749,387	843,139
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 3/	734,325	755,471	968,454	1,006,016	1,101,755	1,220,083	1,374,473	1,439,658	1,583,929	1,642,998
NAT'L INST OF HEALTH	513,650	539,084	714,340	775,697	847,380	935,882	1,051,502	1,066,408	1,164,305	1,198,925
OTHER HHS	220,675	226,450	271,272	237,396	288,999	330,734	365,909	373,250	419,624	444,073
DEPT OF THE INTERIOR .	104,261	111,420	94,817	179,109	205,128	192,363	217,616	266,946	286,585	288,992
DEPT OF TRANSPORTATION	97,648	77,070	61,506	53,769	31,100	51,760	66,500	66,983	70,352	84,100

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TABLE 31. FEDERAL OBLIGATIONS FOR APPLIED RESEARCH BY AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

- CONTINUED

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
OTHER AGENCIES										
ENVIRON'L PROTECTION AGENCY	44,950	65,257	86,794	124,311	141,695	196,956	246,660	248,900	245,000	266,700
NATIONAL AERONAUTICS & SPACE ADMIN	432,981	443,641	539,810	625,804	929,632	792,302	865,438	938,389	1,076,835	1,056,175
NAT'L SCI FOUNDATION	59,579	71,511	105,039	84,026	72,142	63,400	65,462	66,770	74,470	77,450
NUCLEAR REGULATORY COMMISSION	-	-	42,338	64,155	88,432	112,291	133,891	148,772	196,325	217,928
VETERANS ADMIN	63,907	66,535	75,168	83,260	76,227	83,247	90,509	101,839	102,223	105,136
ALL OTHER	131,100	123,525	118,166	110,495	126,536	141,102	166,305	197,382	212,802	248,638

1/ DEPARTMENT OF EDUCATION DATA SHOWN FOR 1972-78 ARE COMPOSED OF DATA FOR THE OFFICE OF EDUCATION, THE NATIONAL INSTITUTE OF EDUCATION, AND THE ASSISTANT SECRETARY FOR EDUCATION OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW).

2/ THE DEPARTMENT OF ENERGY WAS ESTABLISHED IN FY 1977; DATA SHOWN FOR 1972-73 ARE ATOMIC ENERGY COMMISSION AMOUNTS, AND DATA SHOWN FOR 1974-76 ARE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION AMOUNTS.

3/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE HEW AMOUNTS MINUS EDUCATION PROGRAMS.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 32. FEDERAL OBLIGATIONS FOR APPLIED RESEARCH, BY PERFORMER: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

PERFORMER	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL	3,426,186	3,453,524	3,876,716	4,305,470	4,915,273	5,412,633	6,105,296	6,575,859	7,294,523	8,006,436
FEDERAL INTRAMURAL 1/	1,354,058	1,470,968	1,556,710	1,738,141	2,044,499	2,062,314	2,217,956	2,424,665	2,616,147	2,805,280
INDUSTRIAL FIRMS 2/	893,458	841,501	910,557	1,116,942	1,187,714	1,413,607	1,724,711	1,838,826	2,169,834	2,490,123
UNIVS & COLLEGES	624,487	651,456	822,709	832,137	919,492	1,044,830	1,183,925	1,274,749	1,378,583	1,468,066
FFRDC'S ADMIN BY UNIV & COL	143,956	126,182	150,868	167,964	263,394	346,185	358,078	406,994	438,229	507,004
NONPROFIT INSTS 2/	301,003	268,485	335,955	322,412	359,957	406,199	463,549	453,028	481,545	510,620
STATE & LOCAL GOV	76,373	68,095	74,212	97,898	106,457	99,574	111,777	119,708	146,963	154,061
FOREIGN	32,851	26,837	25,705	29,976	33,760	39,924	45,300	57,889	63,222	71,282

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

2/ INCLUDES FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC'S) ADMINISTERED BY THIS SECTOR.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 33. FEDERAL OBLIGATIONS FOR APPLIED RESEARCH, BY FIELD OF SCIENCE: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

FIELD OF SCIENCE	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL, ALL FIELDS	3,426,186	3,453,524	3,876,716	4,305,470	4,915,273	5,412,633	6,105,296	6,575,859	7,294,523	8,006,436
LIFE SCIENCES	976,696	1,054,136	1,243,623	1,358,070	1,433,141	1,643,898	1,857,735	1,979,826	2,151,210	2,255,985
PSYCHOLOGY	64,168	61,835	84,965	78,989	95,577	102,568	112,084	131,157	144,188	162,551
PHYSICAL SCIENCES	386,337	374,276	395,090	427,016	556,094	695,010	762,834	800,025	857,650	1,035,885
ENVIRONMENTAL SCIENCES	288,076	301,791	335,426	443,143	465,911	513,537	573,722	640,103	740,720	798,043
MATH & COMPUTER SCI ..	82,703	76,373	87,849	93,607	97,915	131,864	143,667	161,190	173,928	223,437
ENGINEERING	1,273,517	1,206,865	1,383,301	1,528,598	1,824,875	1,818,476	2,101,733	2,227,792	2,519,781	2,725,119
SOCIAL SCIENCES	225,705	219,056	217,891	228,510	306,461	353,278	382,678	398,335	418,083	446,865
OTHER SCIENCES, NEC ..	128,984	159,192	128,571	147,537	135,299	154,002	170,843	237,431	288,963	358,551

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 34. FEDERAL OBLIGATIONS FOR DEVELOPMENT BY AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL, ALL AGENCIES ..	10,905,384	11,154,095	11,194,650	12,197,932	13,164,548	15,379,806	16,663,376	18,305,207	20,075,084	22,583,842
DEPT OF AGRICULTURE ..	12,404	12,416	13,642	18,138	20,225	22,943	26,798	31,105	34,300	35,186
DEPT OF COMMERCE	43,865	60,445	51,396	70,962	73,140	68,592	90,890	89,901	93,806	102,920
DEPT OF DEFENSE, TOTAL	6,770,776	6,903,506	6,945,740	7,470,287	8,131,463	9,158,454	9,612,425	10,354,593	11,353,196	13,644,129
ARMY	1,713,215	1,651,620	1,661,121	1,561,074	1,707,228	2,008,451	2,134,627	2,306,462	2,417,847	2,650,726
NAVY	2,216,174	2,370,656	2,425,582	2,797,435	3,013,105	3,439,443	3,596,416	3,902,242	4,313,628	4,292,224
AIR FORCE	2,745,378	2,750,547	2,708,179	2,942,010	3,169,527	3,432,295	3,576,622	3,774,916	4,213,549	6,162,808
DEFENSE AGENCIES ...	96,009	105,607	126,642	145,903	217,513	248,026	276,200	341,663	375,572	496,171
OTHER DEFENSE	-	25,076	24,216	23,865	24,090	30,239	28,560	29,310	32,600	42,200
DEPT OF EDUCATION 1/..	94,020	142,354	111,237	106,393	89,699	56,957	74,529	72,896	63,681	63,928
DEPT OF ENERGY 2/.....	880,546	938,412	1,024,155	1,453,875	1,717,310	2,644,954	3,142,584	3,506,920	3,680,031	3,869,811
DEPT OF HEALTH & HUMAN SERVICES, TOTAL 3/	225,064	232,320	296,350	308,972	315,881	323,982	361,328	489,211	494,352	476,441
NAT'L INST OF HEALTH	171,950	182,148	247,144	275,655	292,555	311,201	348,266	423,022	417,823	416,843
OTHER HHS	53,114	68,877	85,041	90,580	50,576	40,859	43,742	66,189	76,529	59,598
DEPT OF THE INTERIOR .	71,409	83,585	48,929	69,276	73,740	58,740	75,482	66,310	62,867	58,973
DEPT OF TRANSPORTATION	212,322	233,404	306,006	257,719	263,400	302,844	341,750	303,106	291,847	294,220

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TABLE 34. FEDERAL OBLIGATIONS FOR DEVELOPMENT BY AGENCY: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

- CONTINUED

AGENCY AND SUBDIVISION	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
OTHER AGENCIES										
ENVIRON'L PROTECTION AGENCY	71,282	106,305	72,919	115,946	103,743	90,198	131,966	151,100	156,300	159,700
NATIONAL AERONAUTICS & SPACE ADMIN	2,392,645	2,266,967	2,156,505	2,129,274	2,223,989	2,497,309	2,530,247	2,959,772	3,499,012	3,796,790
NAT'L SCI FOUNDATION .	27,570	15,940	36,157	25,006	13,480	8,719	5,273	7,900	9,000	11,000
VETERANS ADMIN	2,030	4,541	6,077	7,667	12,552	14,659	14,591	15,642	18,293	18,300
ALL OTHER	101,451	135,195	87,700	107,154	98,676	103,377	224,835	256,751	318,399	352,444

1/ DEPARTMENT OF EDUCATION DATA SHOWN FOR 1972-78 ARE COMPOSED OF DATA FOR THE OFFICE OF EDUCATION, THE NATIONAL INSTITUTE OF EDUCATION, AND THE ASSISTANT SECRETARY FOR EDUCATION OF THE DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE (HEW).

2/ THE DEPARTMENT OF ENERGY WAS ESTABLISHED IN FY 1977; DATA SHOWN FOR 1972-73 ARE ATOMIC ENERGY COMMISSION AMOUNTS, AND DATA SHOWN FOR 1974-76 ARE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION AMOUNTS.

3/ THE DEPARTMENT OF HEALTH AND HUMAN SERVICES WAS ESTABLISHED IN FY 1979; DATA SHOWN FOR PRIOR YEARS ARE HEW AMOUNTS MINUS EDUCATION PROGRAMS.

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 35. FEDERAL OBLIGATIONS FOR DEVELOPMENT, BY PERFORMER: FISCAL YEARS 1972-81

(THOUSANDS OF DOLLARS)

PERFORMER	1972	1973	1974	1975	1976	1977	1978	1979	ESTIMATES 1980	ESTIMATES 1981
TOTAL	10,905,384	11,154,095	11,194,650	12,197,932	13,164,548	15,379,806	16,663,378	18,305,207	20,075,084	22,583,842
FEDERAL INTRAMURAL 1/.	2,603,806	2,652,159	2,640,467	2,871,379	2,905,340	3,124,318	3,665,119	4,045,739	4,339,146	4,987,513
INDUSTRIAL FIRMS 2/...	7,224,520	7,316,589	7,333,728	7,897,562	8,877,044	10,631,950	11,100,416	12,046,159	13,405,132	15,193,733
UNIVS & COLLEGES	260,019	224,975	254,546	325,262	288,327	316,176	432,236	547,676	540,669	566,121
FFRDC'S ADMIN BY UNIV & COL	362,118	370,144	415,170	509,564	512,837	656,505	610,779	710,398	739,176	747,327
NONPROFIT INSTS 2/....	326,898	393,306	406,386	461,182	446,494	500,126	662,001	707,323	740,171	779,994
STATE & LOCAL GOV	112,935	172,552	123,345	115,711	111,794	122,867	139,583	170,655	217,023	229,296
FOREIGN	15,088	24,370	21,008	17,272	22,712	27,864	53,244	77,257	93,767	79,858

1/ FEDERAL INTRAMURAL ACTIVITIES COVER COSTS ASSOCIATED WITH THE ADMINISTRATION OF INTRAMURAL AND EXTRAMURAL PROGRAMS BY FEDERAL PERSONNEL AS WELL AS ACTUAL INTRAMURAL PERFORMANCE.

2/ INCLUDES FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS (FFRDC'S) ADMINISTERED BY THIS SECTOR.

SOURCE: NATIONAL SCIENCE FOUNDATION

Table 36. R&D Scientists and engineers employed in the Federal Government[1] by broad field categories: selected years

	1967	1969	1971	1973	1975	1977	1978
Total	65,500	68,500	67,200	61,800	63,400	64,700	66,300
Military total	12,900	13,900	12,000	8,000	7,700	7,300	7,400
Civilian total	52,600	54,600	55,200	53,800	55,700	57,400	58,900
Scientists	27,300	28,300	27,700	27,000	28,000	28,900	29,700
Physical and environmental scientists	16,000	16,600	15,300	14,900	15,300	15,500	15,900
Life scientists	5,900	6,100	6,300	6,200	6,400	6,900	7,100
Mathematicians and statisticians	3,100	3,200	3,500	3,400	3,600	3,700	3,800
Social scientists[2]	1,500	1,600	1,500	1,500	1,600	1,600	1,700
Psychologists	800	800	1,100	1,000	1,100	1,200	1,200
Engineers	25,300	26,300	27,500	26,800	27,700	28,500	29,200

[1] Includes R&D administrators, R&D grant and contract administrators, and S/E personnel directly engaged in R&D activities; also included are uniformed military S/E personnel, the bulk of whom are assumed to be engaged in R&D activities. Data are calculated on a full-time-equivalent basis.

[2] Includes the fields of economics, sociology, anthropology, geography, cartography, and community planning.

NOTE: Data on military S/E personnel are estimated; detailed data on fields are estimated for some years based on totals provided by the Office of Personnel Management.

SOURCES: National Science Foundation based on data of the Office of Personnel Management and the Department of Defense

Table 37. Funds for industrial R&D performance by source: 1968-79

[Dollars in millions]

Year	Total R&D		Federal			Company		
	Current dollars	Constant 1972 dollars[1]	Current dollars	Constant 1972 dollars[1]	Percent of total	Current dollars	Constant 1972 dollars[1]	Percent of total
1968	17,429	21,116	8,560	10,370	49	8,869	10,745	51
1969	18,308	21,094	8,451	9,737	46	9,857	11,357	54
1970	18,067	19,756	7,779	8,506	43	10,288	11,249	57
1971	18,320	19,081	7,666	7,985	42	10,654	11,097	58
1972	19,552	19,552	8,017	8,017	41	11,535	11,535	59
1973	21,249	20,106	8,145	7,706	38	13,104	12,399	62
1974	22,887	19,915	8,220	7,152	36	14,667	12,763	64
1975	24,187	19,263	8,605	6,853	36	15,582	12,410	64
1976	26,997	20,435	9,561	7,237	35	17,436	13,198	65
1977	29,928	21,403	10,521	7,524	35	19,407	13,879	65
1978	33,164	22,103	11,163	7,439	34	22,001	14,663	66
1979	37,606	23,104	12,342	7,582	33	25,264	15,521	67

[1] Based on the GNP implicit price deflator.

SOURCE: National Science Foundation

Table 38. Funds for industrial R&D performance by industry: 1968-79

[Dollars in millions]

Industry	SIC code	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Total	....	17,429	18,306	18,067	18,320	19,552	21,249	22,887	24,187	26,997	29,928	33,164	37,606
Food and kindred products	20	184	199	230	240	259	269	298	335	355	395	429	475
Textiles and apparel	22,23	58	60	58	59	61	64	69	70	82	81	84	92
Lumber, wood products, and furniture	24,25	20	18	52	53	64	71	84	88	107	127	133	148
Paper and allied products	26	144	188	178	187	189	194	237	249	313	336	391	454
Chemicals and allied products	28	1,589	1,660	1,773	1,832	1,932	2,116	2,450	2,727	3,017	3,256	3,534	4,010
Industrial chemicals	281-82,286	965	1,007	1,031	1,009	1,031	1,119	1,299	1,391	1,524	1,685	1,820	2,018
Drugs and medicines	283	398	444	485	549	607	698	807	961	1,091	1,154	1,270	1,431
Other chemicals	284-85,287-89	226	209	257	274	294	299	344	354	401	417	444	561
Petroleum and refining	29	437	467	515	505	468	498	622	693	767	918	1,060	1,224
Rubber products	30	223	261	276	289	377	426	469	467	502	491	488	551
Stone, clay, and glass products	32	142	159	167	164	183	199	217	233	263	287	321	348
Primary metals	33	251	257	275	272	277	307	358	443	506	534	549	613
Ferrous metals and products	331-32,3398,3399	135	136	149	144	146	163	181	215	256	261	266	393
Nonferrous metals and products	333-36	115	121	126	128	130	145	177	228	250	273	283	320
Fabricated metal products	34	183	182	207	242	253	291	313	324	358	394	396	445
Machinery	35	1,483	1,546	1,729	1,860	2,158	2,549	2,985	3,196	3,487	3,967	4,579	5,142
Office, computing, and accounting machines	357	(1)	(1)	(1)	(1)	1,456	1,733	2,103	2,220	2,402	2,766	3,235	3,597
Other machinery except electrical	35 (Balance)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	1,201	(3)	(3)
Electrical equipment	36	4,083	4,347	4,220	4,389	4,680	4,902	5,011	5,105	5,636	5,937	6,591	7,584
Radio and TV receiving equipment	365	55	57	70	64	48	49	51	50	52	61	51	60
Electronic components	367	2,520	2,670	2,604	2,731	330	406	489	549	691	748	824	1,006
Communication equipment	366					2,583	2,613	2,424	2,385	2,511	2,809	3,189	3,767
Other electrical equipment	361-64,369	1,508	1,620	1,546	1,594	1,719	1,834	2,047	2,121	2,382	2,318	2,527	2,751
Motor vehicles and motor vehicles equipment	371	1,499	1,568	1,591	1,768	1,954	2,405	2,389	2,340	2,778	3,325	3,718	4,320
Other transportation equipment	373-75,379					56	72	87	90	94	119	131	152
Aircraft and missiles	372,376	5,765	5,878	5,219	4,881	4,950	5,052	5,278	5,713	6,339	7,104	7,680	8,414
Professional and scientific instruments	38	663	742	744	746	838	961	1,075	1,173	1,331	1,487	1,713	2,024
Scientific and mechanical measuring instruments	381,82	118	123	131	133	163	186	221	266	325	390	476	592
Optical, surgical, photographic, and other instruments	383-87	545	619	613	612	675	775	854	907	1,007	1,097	1,237	1,432
Other manufacturing industries	21,27,31,39	101	121	128	131	146	158	177	205	217	250	273	293
Nonmanufacturing industries	07-17,41-67,737 739,807,891	603	655	705	704	707	715	768	735	845	921	1,094	1,317

[1] Data not tabulated at this level prior to 1972.

[2] Data not tabulated at this level prior to 1977.

[3] Not separately available but included in total.

SOURCE: National Science Foundation

Table 39. Federal funds for industrial R&D performance by industry: 1968-79

Industry	SIC code	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Total	....	8,560	8,451	7,779	7,666	8,017	8,145	8,220	8,605	9,561	10,521	11,163	12,342
Food and kindred products	20	2	1	3	2	1	1	1	(1)	(1)	(1)	(1)	(1)
Textiles and apparel	22,23	(1)	(1)	(1)	1	1	1	(1)	(1)	(1)	(1)	(1)	(1)
Lumber, wood products, and furniture	24,25	0	0	0	(1)	(1)	(1)	(1)	0	0	0	0	2
Paper and allied products	26	(1)	(1)	(1)	(1)	2	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Chemicals and allied products	28	199	192	180	184	189	203	214	236	266	300	367	379
Industrial chemicals	281-82,286	171	165	158	159	171	183	194	218	249	284	347	360
Drugs and medicines	283	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other chemicals	284-85,287-89	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Petroleum refining	29	34	10	22	17	15	14	20	(1)	52	76	121	142
Rubber products	30	37	65	71	69	123	146	(1)	(1)	(1)	(1)	(1)	(1)
Stone, clay, and glass products	32	3	1	11	10	14	15	14	(1)	(1)	(1)	(1)	(1)
Primary metals	33	9	10	10	6	12	11	8	21	26	25	28	28
Ferrous metals and products	331-32, 3398, 3399,	1		1	2	3	4	(1)	3	4	4	5	5
Nonferrous metals and products	333-36	8	9	9	4	10	7	(1)	17	22	21	23	33
Fabricated metal products	34	18	8	7	11	12	13	14	27	36	45	37	36
Machinery	35	340	260	262	315	401	429	511	509	532	576	592	673
Office, computing, and accounting machines	357	(2)	(2)	(2)	(2)	(1)	(1)	(1)	486	509	546	552	627
Other machinery, except electrical	35 Balance	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	30	(1)	(1)
Electrical equipment	36	2,333	2,390	2,211	2,258	2,367	2,410	2,307	2,307	2,555	2,699	2,864	3,224
Radio and TV receiving equipment	365	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	0	0	0	0
Electronic components	367	1,526	1,557	1,420	1,479	125	146	184	(1)	(1)	(1)	(1)	(1)
Communication equipment	366					1,417	1,362	1,137	1,057	1,093	1,202	1,314	1,543
Other electrical equipment	361-64,369	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Motor vehicles and motor vehicles equipment	371	374	290	314	309	293	385	288	318	383	438	450	628
Other transportation equipment	373-75,379					26	39	47	47	(1)	(1)	(1)	(1)
Aircraft and missiles	372,376	4,533	4,524	4,005	3,864	3,970	3,899	4,000	4,428	4,921	5,541	5,816	6,132
Professional and scientific instruments	38	234	237	194	164	161	160	167	172	163	174	183	223
Scientific and mechanical measuring instruments	381,82	35	32	20	14	13	11	10	15	15	22	26	35
Optical, surgical, photographic, and other instruments	383-87	199	205	174	150	148	149	157	157	148	152	157	188
Other manufacturing industries	21,27,31,39	(1)	(1)	(1)	(1)	(1)	(1)	(1)	7	5	6	9	7
Nonmanufacturing industries	07-17,41-67,737 739,807,891	431	448	460	452	431	416	463	310	375	415	520	645

(1) Not separately available but included in total.
(2) Data not tabulated at this level prior to 1972.
(3) Data not tabulated at this level prior to 1977.
SOURCE: National Science Foundation

Table 40. Company funds for industrial R&D performance by industry: 1968-79

[Dollars in millions]

Industry	SIC code	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Total	....	8,869	9,857	10,288	10,654	11,535	13,104	14,667	15,582	17,436	19,407	22,001	25,264
Food and kindred products	20	182	198	227	238	258	268	297	(1)	(1)	(1)	(1)	(1)
Textiles and apparel	22,23	(1)	(1)	(1)	59	61	63	(1)	(1)	(1)	(1)	(1)	(1)
Lumber, wood products, and furniture	24,25	20	18	52	(1)	(1)	(1)	(1)	88	106	127	133	146
Paper and allied products	26	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Chemicals and allied products	28	1,309	1,468	1,593	1,648	1,741	1,913	2,236	2,490	2,751	2,956	3,167	3,631
Industrial chemicals	281-82,286	810	842	873	850	860	936	1,105	1,173	1,275	1,402	1,473	1,658
Drugs and medicines	283	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other chemicals	284-85,287-89	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Petroleum refining	29	403	457	493	486	454	485	603	(1)	715	842	939	1,082
Rubber products	30	186	196	205	221	255	280	(1)	(1)	(1)	(1)	(1)	(1)
Stone, clay, and glass products	32	139	158	156	153	168	184	203	(1)	(1)	(1)	(1)	(1)
Primary metals	33	241	247	265	266	264	297	350	422	481	507	521	580
Ferrous metals and products	331-32,3398,3399	2	135	148	142	144	159	(1)	211	252	256	261	288
Nonferrous metals and products	333-36	108	112	117	124	121	138	(1)	211	229	251	260	292
Fabricated metal products	34	165	174	201	230	243	279	299	297	322	349	359	409
Machinery	35	1,142	1,286	1,469	1,545	1,758	2,120	2,473	2,687	2,955	3,391	3,987	4,469
Office, computing, and accounting machines	357	(2)	(2)	(2)	(2)	(1)	(1)	(1)	1,734	1,893	2,220	2,683	2,970
Other machinery, except electrical	35 (Balance)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(1)	(1)	(1)
Electrical equipment	36	1,749	1,957	2,008	2,131	2,313	2,491	2,704	2,798	3,081	3,238	3,727	4,363
Radio and TV receiving equipment	365	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	52	61	51	60
Electronic components	367	993	1,113	1,183	1,252	205	260	306	(1)	(1)	(1)	(1)	(1)
Communication equipment	366					1,165	1,251	1,287	1,328	1,418	1,607	1,875	2,224
Other electrical equipment	361-64,369	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Motor vehicles and motor vehicles equipment	371	1,124	1,278	1,278	1,461	1,661	2,020	2,101	2,022	2,395	2,887	3,268	3,692
Other transportation equipment	373-75,379					29	33	40	43	(1)	(1)	(1)	(1)
Aircraft and missiles	372,376	1,230	1,354	1,213	1,017	978	1,154	1,278	1,285	1,418	1,563	1,864	2,281
Professional and scientific instruments	38	429	505	550	583	678	801	908	1,001	1,168	1,313	1,530	1,801
Scientific and mechanical measuring instruments	381,82	83	91	111	120	151	175	211	251	309	368	450	557
Optical, surgical, photographic, and other instruments	383-87	346	414	439	463	527	626	697	750	859	945	1,080	1,244
Other manufacturing industries	21,27,31,39	(1)	(1)	(1)	(1)	(1)	(1)	(1)	198	212	245	264	286
Nonmanufacturing industries	07-17,41-67,737 739,807,891	172	207	225	252	277	299	305	425	471	506	574	672

[1] Not separately available but included in total.

[2] Data not tabulated at this level prior to 1972.

[3] Data not tabulated at this level prior to 1977.

SOURCE: National Science Foundation

Table 41. R&D funds as percent of net sales in R&D-performing manufacturing companies by industry: 1968-79

Industry	SIC code	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Total	....	4.0	4.0	3.7	3.5	3.4	3.3	3.1	3.1	3.1	3.1	3.2	3.1
Food and kindred products	20	.5	.4	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4
Textiles and apparel	22,23	.5	.6	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4
Lumber, wood products, and furniture	24,25	.4	.4	.8	.7	.8	.7	.8	.7	.7	.8	.7	.7
Paper and allied products	26	.9	1.0	.9	.9	.8	.7	.8	.9	1.0	.9	1.0	.9
Chemicals and allied products	28	3.8	3.9	3.9	3.7	3.6	3.5	3.5	3.7	3.7	3.7	3.5	3.5
Industrial chemicals	281-82,286	4.0	4.0	4.2	3.9	3.9	3.6	3.3	3.6	3.7	3.5	3.5	3.2
Drugs and medicines	283	6.0	6.0	6.7	6.2	6.5	6.5	6.3	6.4	6.3	6.4	6.3	6.6
Other chemicals	284-85,287-89	2.1	2.0	1.8	1.9	1.7	1.6	1.6	1.7	1.7	1.8	1.6	1.8
Petroleum refining	29	.8	.9	1.0	.9	.8	.7	.6	.7	.6	.7	.7	.6
Rubber products	30	2.1	2.2	2.3	2.2	2.6	2.6	2.5	2.5	2.4	2.1	1.9	1.9
Stone, clay, and glass products	32	1.6	1.7	1.8	1.8	1.7	1.7	1.7	1.2	1.2	1.2	1.2	1.2
Primary metals	33	.8	.8	.8	.8	.7	.7	.6	.8	.8	.7	.6	.6
Ferrous metals and products	331-32,3398,3399	.7	.7	.7	.7	.6	.5	.5	.6	.6	.6	.5	.5
Nonferrous metals and products	333-36	1.0	1.0	1.0	1.0	.9	.9	1.0	1.2	1.2	1.0	.9	.8
Fabricated metal products	34	1.3	1.2	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.2	1.1	1.1
Machinery	35	4.0	3.8	4.0	4.0	4.3	4.6	4.6	4.8	4.9	5.1	5.1	5.0
Office, computing, and accounting machines	357	(1)	(1)	(1)	(1)	11.1	11.6	12.6	12.0	11.6	11.9	11.9	11.7
Other machinery, except electrical	35 (Balance)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	2.2	2.2	2.2
Electrical equipment	36	8.4	7.9	7.3	7.2	7.1	6.9	6.6	6.5	6.7	6.2	6.3	6.4
Radio and TV receiving equipment	365	2.2	2.2	2.7	2.4	1.6	1.7	1.7	1.4	1.4	1.4	1.1	1.2
Electronic components	367	10.9	9.7	8.2	8.2	5.9	6.2	6.2	6.9	7.3	6.9	6.6	6.5
Communication equipment	366					8.7	8.1	7.6	7.6	7.6	7.6	7.7	7.9
Other electrical equipment	361-64,369	6.8	6.6	6.6	6.4	6.3	6.3	6.3	6.0	6.3	5.3	5.3	5.1
Motor vehicles and motor vehicles equipment	371	3.1	3.1	3.5	3.1	3.3	3.5	3.7	3.5	3.2	3.1	3.2	3.8
Other transportation equipment	373-75,379					1.0	1.2	1.3	1.3	1.3	1.5	1.3	1.2
Aircraft and missiles	372,376	19.0	20.2	16.2	16.2	16.6	13.3	14.1	12.7	12.7	12.8	12.2	12.1
Professional and scientific instruments	38	6.5	6.4	5.7	5.7	5.9	6.1	6.1	5.9	6.2	6.1	6.0	6.2
Scientific and mechanical measuring instruments	381,82	4.1	3.8	3.5	3.7	4.1	4.3	4.5	4.9	5.4	5.9	5.8	6.1
Optical, surgical, photographic, and other instruments	383-87	7.4	7.4	6.6	6.4	6.6	6.8	6.7	6.3	6.4	6.2	6.2	6.4
Other manufacturing industries	21,27,31,39	.8	.8	.8	.8	.8	.8	.9	.8	.7	.7	.7	.7

[1] Data not tabulated at this level prior to 1972.

[2] Data not tabulated at this level prior to 1977.

SOURCE: National Science Foundation

Table 42. Company R&D funds as percent of net sales in R&D-performing manufacturing companies by industry: 1968-79

Industry	SIC code	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Total	....	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1
Food and kindred products	20	0.5	0.4	0.5	0.5	0.4	0.4	0.4	(1)	(1)	(1)	(1)	(1)
Textiles and apparel	22,23	(1)	(1)	(1)	0.5	0.4	0.4	(1)	(1)	(1)	(1)	(1)	(1)
Lumber, wood products, and furniture	24,25	0.4	0.3	0.8	(1)	(1)	(1)	(1)	0.7	0.7	0.8	0.7	0.7
Paper and allied products	26	(1)	(1)	(1)	(1)	0.8	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Chemicals and allied products	28	3.4	3.4	3.5	3.3	3.3	3.1	3.0	3.1	3.3	3.3	3.2	3.2
Industrial chemicals	281-82,286	3.3	3.4	3.6	3.3	3.2	3.0	2.8	3.1	3.1	3.0	2.8	2.6
Drugs and medicines	283	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Other chemicals	284-85,287-89	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Petroleum refining	29	0.8	0.9	0.9	0.8	0.7	0.7	0.5	(1)	0.6	.6	.7	.5
Rubber products	30	1.8	1.6	1.7	1.7	1.7	1.7	(1)	(1)	(1)	(1)	(1)	(1)
Stone, clay, and glass products	32	1.6	1.7	1.7	1.6	1.6	1.5	1.5	(1)	(1)	(1)	(1)	(1)
Primary metals	33	0.8	0.8	0.8	0.8	0.7	0.6	0.5	0.7	0.8	0.7	0.6	0.6
Ferrous metals and products	331-32,3398,3399	0.7	0.7	0.7	0.7	0.6	0.5	(1)	0.6	0.6	0.6	0.5	0.5
Nonferrous metals and products	333-36	0.9	0.9	0.9	1.0	0.9	0.8	(1)	1.1	1.1	0.9	0.8	0.7
Fabricated metal products	34	1.2	1.2	1.1	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.0	1.0
Machinery	35	3.1	3.2	3.4	3.3	3.5	3.8	3.8	4.0	4.2	4.4	4.3	4.3
Office, computing, and accounting machines	357	(2)	(2)	(2)	(2)	(1)	(1)	(1)	9.4	9.1	9.5	9.6	9.7
Other machinery, except electrical	Balance of 35	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	2.1	2.1	(1)
Electrical equipment	36	3.6	3.5	3.4	3.5	3.5	3.5	3.5	3.6	3.7	3.4	3.5	3.7
Radio and TV receiving equipment	365	(1)	(1)	(1)	(1)	(1)	(1)	(1)	1.4	1.4	1.4	1.1	1.2
Electronic components	367	4.3	4.0	3.7	3.8	3.7	3.9	3.9	(1)	(1)	(1)	(1)	(1)
Communication equipment	366					3.9	3.9	3.9	4.2	4.3	4.4	4.5	4.7
Other electrical equipment	361-64,369	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Motor vehicles and motor vehicles equipment	371	2.4	2.6	2.8	2.5	2.8	2.9	3.2	3.0	2.7	2.7	2.9	3.2
Other transportation equipment	373-75,379					0.6	0.6	0.6	0.6	0.6	0.7	0.6	(1)
Aircraft and missiles	372,376	4.1	4.6	3.8	3.4	3.3	3.0	3.5	2.8	2.8	2.8	3.0	3.3
Professional and scientific instruments	38	4.2	4.4	4.2	4.5	4.8	5.1	5.2	5.1	5.4	5.4	5.5	5.4
Scientific and mechanical measuring instruments	381,82	2.9	2.8	2.9	3.3	3.8	4.0	4.4	4.7	5.3	5.5	5.5	5.0
Optical, surgical, photographic, and other instruments	383-87	4.7	5.0	4.7	4.9	5.1	5.5	5.5	5.2	5.5	5.3	5.5	5.6
Other manufacturing industries	21,27,31,39	(1)	0.7	0.8	(1)	(1)	(1)	(1)	0.7	0.7	0.7	0.7	0.7

[1] Not separately available but included in total.

[2] Data not tabulated at this level prior to 1972.

[3] Data not tabulated at this level prior to 1977.

SOURCE: National Science Foundation

Table 43. Funds for the performance of industrial basic research by industry: 1968-79

[Dollars in millions]

Industry	SIC code	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1979[4]
Total		642	618	602	590	593	631	699	730	819	911	1,188
Food and kindred products	20	16	16	16	25	13	11	9	11	18	19	(1)
Textiles and apparel	22,23	2	2	2	2	2	1	2	(1)	(1)	(1)	3
Lumber, wood products, and furniture	24,25	(1)	(1)	(1)	(1)	(1)	(1)	(1)	3	5	7	6
Paper and allied products	26	4	4	5	4	4	5	7	5	6	9	20
Chemicals and allied products	28	202	208	207	216	214	236	288	294	304	336	367
Industrial chemicals	281-82, 286	(1)	(1)	(1)	118	117	125	157	154	154	165	202
Drugs and medicines	283	60	67	93	77	78	90	107	112	119	131	143
Other chemicals	284-85, 287-89	14	14	18	21	19	21	24	27	32	40	22
Petroleum refining and extraction	29	37	38	26	21	22	26	33	36	44	48	74
Rubber products	30	6	8	5	4	6	3	5	4	7	9	23
Stone, clay, and glass products	32	(1)	(1)	(1)	14	18	20	21	32	38	41	44
Primary metals	33	14	16	18	17	9	8	9	14	16	15	28
Ferrous metals and products	331-32,3398,3399	(1)	(1)	(1)	(1)	(1)	(1)	(1)	4	5	5	12
Nonferrous metals and products	333-36	5	8	8	(1)	(1)	(1)	(1)	10	12	10	16
Fabricated metal products	34	3	3	5	(1)	7	11	3	5	2	2	5
Machinery	35	31	21	21	22	24	24	28	32	56	59	112
Office, computing, and accounting machines	357	(2)	(2)	(1)	(1)	(1)	(1)	(1)	26	38	43	95
Other machinery except electrical	35 (Balance)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)	16	(1)
Electrical equipment and communication	36	134	133	139	136	137	143	143	142	163	181	220
Radio and TV receiving equipment	365	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Electronic components	367	115	117	122	120	10	8	5	4	5	6	7
Communication equipment and communication	366					108	117	116	119	130	146	165
Other electrical equipment	361-64,369	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Motor vehicles and motor vehicles equipment	371	(1)	(1)	(1)	21	10	8	9	10	8	12	16
Other transportation equipment	373-75,379					(1)	(1)	(1)	(1)	(1)	(1)	(1)
Aircraft and missiles	372,376	70	65	63	50	62	58	57	54	54	56	73
Professional and scientific instruments	38	(1)	(1)	(1)	19	17	15	16	16	23	22	31
Scientific and mechanical measuring instruments	381-82	(1)	(1)	(1)	7	6	5	5	9	10	10	18
Optical, surgical, photographic, and other instruments	383-87	(1)	(1)	(1)	12	11	10	11	8	12	12	13
Other manufacturing industries	21,27,31,39	5	5	4	6	5	6	6	(1)	(1)	(1)	52
Nonmanufacturing industries	07-17, 41-67, 737, 739, 807 891	45	43	38	31	28	28	26	25	29	42	64

[1] Not separately available but included in total.

[2] Data not tabulated at this level prior to 1972.

[3] Data not tabulated at this level prior to 1977.

[4] Data not collected for 1978.

SOURCE: National Science Foundation

Table 44. Funds for the performance of industrial basic research by field of science: 1968-79

[Dollars in millions]

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1979[2,3]
Total	642	618	602	590	593	631	699	730	819	911	1,188
Physical sciences	317	324	297	281	277	276	319	320	359	405	549
Chemistry	191	213	196	180	183	193	229	228	253	285	373
Physics	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Astronomy	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Mathematics	13	13	13	14	12	14	13	14	18	19	17
Environmental sciences	11	11	8	8	6	7	10	15	17	19	12
Atmospheric sciences	(1)	(1)	(1)	3	(1)	2	3	6	6	5	5
Geological sciences	(1)	(1)	(1)	3	4	3	5	5	7	7	6
Oceanography	(1)	(1)	(1)	2	(1)	1	1	3	4	7	2
Engineering (including metallurgy)	181	170	170	159	183	185	178	191	204	233	300
Life sciences	76	74	86	94	82	102	119	122	134	156	(1)
Biological sciences	50	58	51	57	61	77	83	85	102	128	(1)
Clinical medical sciences	26	16	35	37	21	25	36	37	32	28	(1)
Other sciences	43	26	28	34	33	47	60	67	85	78	(1)

[1] Not separately available but included in total.

[2] Preliminary.

[3] Data not collected for 1978.

SOURCE: National Science Foundation

Table 45. Funds for the performance of industrial applied research: 1971-79

[Millions of constant 1972 dollars[1]]

Year	Funds	Percent change
1971	3,556	– 5.1
1972	3,514	– 1.2
1973	3,620	+ 3.0
1974	3,731	+ 3.1
1975	3,640	– 2.4
1976	3,869	+ 6.3
1977	4,045	+ 4.5
1978	4,178	+ 3.3
1979 (prel.)	4,371	+ 4.6

[1] Based on the GNP implicit price deflator.

SOURCE: National Science Foundation

Table 46. Funds for the performance of applied research and development by product field: 1968-79

[Dollars in millions]

Product field	SIC Code	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1979[3,4]
Total		16,787	17,690	17,465	17,730	18,959	20,618	22,188	23,457	26,178	29,017	36,418
Atomic energy devices		(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Ordnance and accessories, n.e.c.	348	201	186	192	192	177	228	222	187	199	288	312
Guided missiles and spacecraft	376	3,786	3,711	3,115	2,832	2,647	2,491	2,486	2,925	2,880	3,035	4,418
Food and kindred products	20	165	179	206	211	233	250	293	284	321	350	528
Textile mill products	22	58	66	55	60	83	93	82	73	81	96	(1)
Chemicals, except drugs and medicines	28, except 283	1,168	1,214	1,339	1,345	1,250	1,342	1,564	1,627	1,853	2,024	2,475
Industrial inorganic and organic chemicals	281, 286	396	417	442	457	451	489	589	665	728	822	668
Plastics materials and synthetic resins, rubber, and fibers	282	466	482	521	511	453	511	589	588	674	747	(2)
Agricultural chemicals	287	99	104	126	130	108	114	137	176	205	236	289
Other chemicals	284-85	207	210	223	218	238	229	248	198	246	220	(2)
Drugs and medicines	283	375	417	474	535	531	605	683	783	883	959	(2)
Petroleum refining and extraction	29	239	252	272	266	299	319	363	408	425	473	643
Rubber and miscellaneous plastics products	30	160	163	193	215	279	294	341	324	325	378	403
Stone, clay, and glass products	32	130	157	128	128	135	162	181	150	171	191	233
Primary metals	33	207	224	235	230	245	272	311	290	311	327	466
Ferrous metals and products	331,332,3398,3399	119	125	127	114	137	158	156	144	163	172	223
Nonferrous metals and products	333-36	88	99	108	116	108	114	155	147	148	155	243
Fabricated metal products	34	478	504	622	701	731	769	903	916	1,025	1,157	1,366
Machinery	35	1,396	1,562	1,676	1,783	1,989	2,307	2,689	2,628	3,001	3,572	4,512
Engines and turbines	351	203	196	204	246	316	360	482	464	477	531	583
Farm machinery and equipment	352	96	99	89	90	93	120	131	138	168	222	291
Construction, mining, and materials handling	353	129	154	182	196	206	265	283	285	317	378	625
Metalworking machinery and equipment	354	90	83	86	84	76	69	74	80	83	126	336
Office, computing, and accounting machines	357	678	812	863	903	1,028	1,219	1,422	1,339	1,580	1,856	1,940
Other machinery, except electrical	35 (balance)	201	218	252	264	270	274	297	322	376	458	736
Electrical equipment, except communication	36 except 365-67 and 3825	3,363	3,409	3,372	688	775	857	929	774	874	905	970
Electric transmission and distribution equipment	361,3825				181	189	204	239	205	224	225	189
Electrical industrial apparatus	362				187	231	263	264	260	306	299	288
Other electrical equipment and supplies	363-64,369				320	355	390	426	309	344	381	492
Communication equipment and electronic components	365-67				2,927	3,234	3,621	3,896	3,911	4,483	5,038	6,625
Motor vehicles and other transportation equipment	37, except 372,376	956	1,139	1,138	1,341	1,668	2,014	1,994	1,924	2,263	2,611	3,445
Motor vehicles and equipment	371	860	1,051	1,046	1,228	1,470	1,824	1,784	1,720	(2)	(2)	(2)
Other transportation equipment	373-75,379	96	88	90	113	198	190	210	204	193	201	203
Aircraft and parts	372	2,370	2,579	2,556	2,486	2,396	2,548	2,420	2,265	2,733	3,125	3,424
Professional and scientific instruments	38, except 3825	719	814	724	652	847	981	1,090	1,002	1,173	1,276	1,418
Other product fields, not elsewhere classified		1,013	1,124	1,194	1,177	1,440	1,465	1,742	2,987	3,179	3,219	3,987

[1] Distributed according to SIC code from 1968 to present.

[2] Not separately available but included in total.

[3] Preliminary.

[4] Data not collected for 1978.

SOURCE: National Science Foundation

Table 47. Funds for industrial energy R&D performance by primary energy source: 1972-80

[Dollars in millions]

Primary energy source	1972	1973	1974	1975	1976	1977	1978	1979	1980 (Projected)
Total	750	1,009	1,339	1,774	2,073	2,599	3,026	3,688	4,104
Fossil fuels	(1)	438	516	550	605	765	860	1,025	1,078
Oil	(1)	297	329	333	381	454	(1)	554	582
Gas	(1)	51	74	66	68	94	(1)	113	118
Shale	(1)	12	18	19	24	35	(1)	20	22
Coal	(1)	49	65	109	127	177	(1)	287	302
Synthetic fossil fuels	(1)	(1)	21	50	74	116	(1)	215	227
Mining	(1)	(1)	5	9	10	9	(1)	1	1
Other	(1)	(1)	39	50	43	52	(1)	71	74
Other fossil fuels	(1)	29	30	23	5	5	(1)	51	54
Nuclear	(1)	501	601	700	799	935	1,016	996	932
Fission	(1)	476	567	659	741	852	(1)	798	848
Fusion	(1)	25	34	41	58	83	(1)	119	84
All other energy	(1)	70	222	524	669	899	1,150	1,667	2,094
Geothermal	(1)	1	2	6	13	24	(1)	160	213
Solar	(1)	2	7	19	43	65	(1)	347	458
Conservation and utilization	(1)	(1)	137	435	528	694	(1)	731	966
All other sources	(1)	67	76	64	85	116	(1)	429	457

[1] Category not available for reporting purposes.

SOURCE: National Science Foundation

Table 48. Funds for industrial pollution abatement R&D performance by type of pollution and source of funds: 1973-80

[Dollars in millions]

Year	Total		Source of funds		Type of pollution			
	Current dollars	Constant 1972 dollars	Federal	Company	Air[1]	Water	Solid Waste	Other
1973	603	571	35	568	461	76	10	56
1974	657	572	51	606	508	60	14	75
1975	647	515	41	606	478	71	23	75
1976	754	571	51	703	569	84	21	80
1977	901	644	56	945	676	97	28	100
1978	1,054	702	76	978	NA	NA	NA	NA
1979	1,188	730	93	1,095	919	116	43	110
1980 (est.)	1,213	684	NA	NA	912	119	58	124

[1] Includes automotive emission, electric power plant emissions, etc.

NOTE: Type of pollution and source of funds are in current dollars.

SOURCE: National Science Foundation

Table 49. Full-time-equivalent number of R&D scientists and engineers by industry: 1968-80

Industry	SIC code	January											
		1968	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Total (January)		376.7	384.2	367.0	350.2	357.7	360.0	363.3	364.4	382.8	403.7	421.0	444.5
Total (Annual Average)		381.9	375.4	358.4	353.9	358.4	361.2	363.8	373.6	393.2	412.4	432.8	NA
Food and kindred products	20	6.3	6.3	6.6	6.5	6.6	6.4	6.8	6.9	6.9	6.9	7.8	7.5
Textiles and apparel	22,23	2.5	2.9	1.8	1.8	1.9	1.8	1.8	1.8	1.7	1.7	1.8	1.8
Lumber, wood products, and furniture	24,25	.5	1.2	1.8	1.8	1.9	2.1	2.3	2.1	2.1	2.2	2.2	2.2
Paper and allied products	26	4.8	5.0	5.0	4.9	4.9	4.9	5.0	5.2	6.3	6.6	7.2	7.6
Chemicals and allied products	28	38.9	40.1	42.7	41.0	40.9	41.8	45.2	44.4	46.4	47.9	48.3	50.9
Industrial chemicals	281-82,286	22.3	21.5	21.8	19.1	19.1	19.1	21.1	20.1	20.6	21.5	21.6	22.1
Drugs and medicines	283	9.8	11.8	12.3	13.1	13.0	14.0	15.6	16.6	17.8	18.9	19.7	20.7
Other chemicals	284-85,287-89	6.8	6.8	8.6	8.8	8.8	8.7	8.5	7.8	8.0	7.4	7.0	8.1
Petroleum refining	29	9.2	9.9	9.2	8.3	8.2	8.2	8.4	8.6	8.9	10.0	10.7	10.7
Rubber products	30	6.1	7.4	6.7	6.7	7.5	7.7	8.4	8.6	9.1	7.9	8.0	9.2
Stone, clay, and glass products	32	4.1	4.6	4.3	4.1	4.2	4.5	4.5	4.6	4.5	5.1	5.2	5.0
Primary metals	33	5.9	6.5	6.6	6.4	6.0	6.4	6.3	8.1	8.4	8.1	8.2	8.4
Ferrous metals and products	331-32,3398,3399	3.1	3.2	3.4	3.4	3.2	3.3	3.3	3.9	3.9	3.7	3.7	3.6
Nonferrous metals and products	333-36	2.7	3.3	3.2	3.0	2.8	3.1	3.0	4.2	4.5	4.4	4.5	4.8
Fabricated metal products	34	5.6	5.9	7.1	6.6	6.7	7.3	7.4	6.8	7.1	7.3	7.5	7.7
Machinery	35	37.4	42.3	42.7	43.7	46.3	51.0	52.8	55.7	55.3	58.2	61.0	63.3
Office, computing and accounting machines	357	(1)	(1)	(1)	(1)	30.1	34.5	36.1	38.1	37.7	39.3	42.4	43.0
Other machinery, except electrical	35 (Balance)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	17.6	18.9	(3)	(3)
Electrical equipment	36	98.4	100.6	91.8	83.6	85.4	82.6	82.6	80.3	84.1	85.7	86.6	94.7
Radio and TV receiving equipment	365	1.0	1.9	2.4	2.1	1.4	1.3	1.0	1.1	.9	9	(3)	(3)
Electronic components	367	67.4	64.8	60.3	53.2	9.4	9.6	10.6	10.2	13.0	14.2	(3)	(3)
Communication equipment	366					45.3	42.0	40.2	37.4	38.0	40.6	42.2	45.2
Other electrical equipment	361-64,369	30.0	33.9	29.1	28.3	29.3	29.7	30.8	31.6	32.2	30.0	29.4	31.8
Motor vehicles and motor vehicles equipment	371	24.3	25.5	28.2	29.7	28.2	27.4	26.0	25.4	28.2	30.7	32.9	34.4
Other transportation equipment	373-75,379					1.7	1.8	1.9	1.7	1.9	1.9	2.0	1.8
Aircraft and missiles	372,376	101.1	92.2	78.2	70.8	72.1	70.6	67.5	66.9	72.0	82.0	86.4	87.3
Professional and scientific instruments	38	14.1	15.0	15.1	15.2	16.3	17.5	17.9	18.8	20.5	22.2	24.0	28.4
Scientific and mechanical measuring instruments	381,82	3.8	4.1	4.6	4.7	5.3	5.6	5.9	6.7	7.2	7.9	9.0	11.4
Optical, surgical, photographic, and other instruments	383-87	10.3	10.9	10.5	10.5	11.0	11.9	12.0	12.1	13.3	14.3	15.0	17.0
Other manufacturing industries	21,27,31,39	2.4 17.8	2.6 19.2	3.8	3.6	3.6	3.7	3.7	4.2	4.5	4.6	4.8	4.3
Nonmanufacturing industries	07-17,41-67,737 739,807,891	15.1	16.3	15.6	15.7	15.3	14.4	14.9	14.6	15.3	14.7	16.4	19.3

[1] Data not tabulated at this level prior to 1972

[2] Data not tabulated at this level prior to 1977

[3] Not separately available but included in total

SOURCE: National Science Foundation

Table 50. Full-time-equivalent R&D scientists and engineers per 1,000 employees by industry: 1968-78

Industry and size of company	SIC code	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Total		26	26	26	26	24	24	25	26	27	27	28[1]
Food and kindred products	20	8	7	7	7	7	7	7	7	7	7	8
Textiles and apparel	22.23	4	4	4	3	3	3	3	3	3	3	3
Lumber wood products and furniture	24 25	4	5	6	7	6	7	7	7	7	7	6
Paper and allied products	26	6	6	8	8	8	8	8	10	12	12	13
Chemicals and allied products	28	35	35	39	41	39	38	40	41	40	42	42
Industrial chemicals	281-82	32	32	34	34	33	33	34	35	36	38	39
Drugs and medicines	283	48	48	65	65	60	57	57	59	64	62	63
Other chemicals	284-89	30	31	30	31	31	29	30	29	28	28	25
Petroleum refining and extraction	29	15	16	17	17	16	17	18	19	17	18	20
Rubber products	30	17	17	17	15	16	17	17	18	18	19	18
Stone clay and glass products	32	10	10	11	11	10	10	11	11	11	12	13
Primary metals	33	5	6	6	6	6	5	5	7	8	8	7
Ferrous metals and products	331-32 3398 3399	4	4	4	4	4	4	4	5	5	5	5
Nonferrous metals and products	333-36	8	9	10	9	8	9	9	11	15	14	13
Fabricated metal products	34	12	12	10	11	10	11	11	12	12	12	11
Machinery	35	26	27	28	29	31	31	34	36	38	38	38
Office computing and accounting machines	357	([2])	([2])	([2])	([2])	66	65	67	76	79	77	76
Electrical equipment and communication	36	45	42	41	38	37	37	37	40	42	41	40
Radio and TV receiving equipment	365	22	32	32	35	26	20	18	16	15	13	14
Electronic components	367	58	50	46	43	39	40	40	49	55	54	51
Communication equipment and communication	366.48					42	43	43	44	45	46	46
Other electrical equipment	361-64.369	33	33	35	32	31	31	32	36	38	34	32
Motor vehicles and motor vehicles equipment	371	19	19	20	22	23	22	24	25	25	24	24
Other transportation equipment	373-75.379					14	13	13	13	14	13	14
Aircraft and missiles	372.376	81	80	73	74	76	68	72	72	78	82	87
Professional and scientific instruments	38	37	34	29	33	33	34	35	38	41	42	44
Scientific and mechanical measuring instruments	381-82	29	28	27	31	31	33	35	41	45	45	47
Optical surgical photographic and other instruments	383-87	40	36	32	33	34	35	35	37	38	41	43
Other manufacturing industries	21, 27, 31, 39	6	7	6	7	6	6	6	7	8	7	8
Nonmanufacturing industries	07-17, 41-67, 737, 739, 807 893	12	12	23	22	21	18	17	16	19	18	17

[1] The number of R&D scientists and engineers for 1978 is derived by dividing the arithmetic mean of scientists and engineers employed in January 1978 and January 1979 by the number of company employees in all activities in March 1978. Similar procedures were used in earlier years except 1968 and 1969 in which data were derived by dividing the man-years of R&D scientists and engineers for the year by the March employment figures.

[2] Data not tabulated at this level prior to 1972.

SOURCE: National Science Foundation

TABLE 51. R&D EXPENDITURES AT UNIVERSITIES AND COLLEGES, BY SOURCE OF FUNDS, CHARACTER OF WORK, AND FIELD OF SCIENCE: FISCAL YEARS 1968, 1970, AND 1972-79

(DOLLARS IN THOUSANDS)

SOURCE, CHARACTER, AND FIELD	1968	1970	1972	1973	1974	1975	1976	1977	1978 1/	1979
TOTAL	2,148,708	2,334,859	2,630,442	2,883,958	3,022,642	3,408,616	3,727,286	4,063,233	4,614,053	5,182,729
SOURCE OF FUNDS:										
FEDERAL GOVERNMENT	1,572,064	1,647,500	1,795,045	1,985,386	2,032,204	2,287,844	2,511,603	2,729,181	3,056,875	3,431,538
STATE AND LOCAL GOVERNMENTS	172,195	218,777	269,582	294,572	306,881	331,642	363,024	373,192	413,546	467,311
INDUSTRY	55,253	60,538	74,413	83,968	95,953	112,988	123,113	138,789	169,598	193,794
INSTITUTIONAL FUNDS	217,810	243,051	304,789	318,289	369,689	417,453	444,994	507,539	614,965	716,241
ALL OTHER SOURCES	131,386	164,993	186,613	201,743	217,915	258,689	284,552	314,532	359,069	373,645
CHARACTER OF WORK: 2/										
BASIC RESEARCH	1,649,616	1,795,864	2,022,150	2,053,140	2,153,952	2,409,819	2,547,578	2,795,148	-	3,552,074
APPLIED RESEARCH AND DEVELOPMENT	499,092	538,995	608,292	830,818	868,690	998,797	1,179,708	1,268,085	-	1,630,655
FIELD OF SCIENCE:										
ENGINEERING	309,137	318,836	341,362	333,129	346,905	380,970	431,735	498,473	601,062	715,454
PHYSICAL SCIENCES	319,739	307,310	324,222	328,262	333,479	350,327	379,429	427,319	495,281	559,566
ASTRONOMY	24,103	18,597	21,596	24,114	24,427	26,611	26,294	32,361	36,782	39,026
CHEMISTRY	104,695	102,002	108,122	113,687	115,777	120,726	140,153	163,628	182,428	204,062
PHYSICS	172,660	161,921	159,067	167,013	169,250	173,538	183,067	201,330	234,742	275,680
OTHER, N.E.C.	18,291	24,790	35,437	23,448	24,025	29,452	29,915	30,000	41,329	40,798
ENVIRONMENTAL SCIENCES	120,463	125,315	189,021	209,385	235,072	255,079	286,887	317,507	377,548	429,129
MATHEMATICAL SCIENCES	57,621	72,413	69,322	72,741	76,709	85,319	86,997	106,579	124,597	145,087
MATHEMATICS 3/	-	-	-	37,084	37,507	39,719	42,492	51,402	57,664	65,637
COMPUTER SCIENCES 3/	-	-	-	35,657	39,202	45,600	44,505	55,177	66,933	79,450
LIFE SCIENCES	1,037,031	1,194,249	1,329,320	1,529,808	1,631,778	1,901,100	2,101,629	2,257,381	2,535,329	2,814,824
BIOLOGICAL SCIENCES	490,607	547,193	443,473	556,676	510,210	630,263	710,657	771,096	857,969	949,993
AGRICULTURAL SCIENCES 4/	-	-	227,079	276,870	347,514	383,855	412,868	460,647	497,662	565,697
MEDICAL SCIENCES	477,346	549,121	594,574	645,709	716,080	811,524	897,376	950,907	1,093,499	1,214,442
OTHER, N.E.C.	69,078	97,935	64,194	50,553	57,974	75,458	80,728	74,731	86,199	84,672
PSYCHOLOGY	59,286	59,250	69,188	73,742	74,236	79,872	77,887	84,517	89,035	99,732
SOCIAL SCIENCES	167,986	168,669	202,792	231,115	240,617	256,114	262,260	265,828	274,723	290,057
ECONOMICS	35,017	38,616	45,784	47,628	47,685	55,936	65,440	71,383	78,927	85,415
POLITICAL SCIENCE	20,742	19,273	21,396	25,504	27,017	29,386	28,353	32,167	35,869	39,029
SOCIOLOGY	38,587	44,383	58,451	61,514	63,447	68,755	66,240	61,119	65,804	72,669
OTHER, N.E.C.	73,640	66,397	77,161	96,469	102,468	102,037	102,227	101,159	94,123	92,944
OTHER SCIENCES, N.E.C.	77,445	88,817	105,215	105,776	83,846	99,835	100,462	105,629	116,478	128,880

1/ ESTIMATED, BASED ON DATA COLLECTED FROM DOCTORATE-GRANTING INSTITUTIONS ONLY.
2/ DATA WERE NOT COLLECTED IN 1978.
3/ NOT SEPARATELY AVAILABLE PRIOR TO 1973.
4/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN BIOLOGICAL SCIENCES; ESTIMATED FOR 1972 AND 1973, BASED ON DATA COLLECTED IN 1974.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 52. R&D EXPENDITURES AT DOCTORATE-GRANTING INSTITUTIONS, BY SOURCE OF FUNDS, CHARACTER OF WORK, AND FIELD OF SCIENCE: FISCAL YEARS 1968, 1970, AND 1972-79

(DOLLARS IN THOUSANDS)

SOURCE, CHARACTER, AND FIELD	1968	1970	1972	1973	1974	1975	1976	1977	1978	1979
TOTAL	2,092,214	2,286,182	2,568,573	2,809,160	2,948,761	3,334,230	3,654,035	3,984,063	4,529,301	5,092,748
SOURCE OF FUNDS:										
FEDERAL GOVERNMENT	1,532,312	1,615,276	1,754,798	1,938,225	1,985,318	2,236,927	2,464,217	2,680,438	3,003,012	3,370,396
STATE AND LOCAL GOVERNMENTS ..	168,619	214,197	261,026	282,281	294,522	325,205	355,722	364,809	405,501	458,618
INDUSTRY	53,116	58,479	73,006	81,783	93,781	110,134	120,076	135,013	165,487	190,341
INSTITUTIONAL FUNDS	211,854	237,588	297,906	310,595	362,495	409,389	436,015	496,181	603,045	704,050
ALL OTHER SOURCES	126,313	160,642	181,837	196,276	212,645	252,575	278,005	307,622	352,256	369,343
CHARACTER OF WORK: 1/										
BASIC RESEARCH	1,617,277	1,768,569	1,987,822	2,021,690	2,115,696	2,366,688	2,505,466	2,753,910	-	3,501,272
APPLIED RESEARCH AND DEVELOPMENT	474,937	517,613	580,751	787,470	833,065	967,542	1,148,569	1,230,153	-	1,591,476
FIELD OF SCIENCE:										
ENGINEERING	300,526	311,487	335,111	328,206	343,969	377,165	425,182	490,931	591,962	708,263
PHYSICAL SCIENCES	307,226	297,767	314,656	315,751	322,181	338,493	366,491	414,503	480,327	542,935
ASTRONOMY	23,803	18,356	21,373	23,853	24,185	26,398	26,094	32,117	36,505	38,530
CHEMISTRY	97,609	97,303	103,794	108,060	110,587	114,954	133,607	156,728	174,733	196,539
PHYSICS	168,343	158,182	154,640	162,189	165,323	169,338	179,013	197,536	230,321	270,332
OTHER, N.E.C.	17,471	23,926	34,849	21,649	22,086	27,803	27,777	28,122	38,768	37,534
ENVIRONMENTAL SCIENCES	114,970	121,634	183,943	203,016	227,989	246,785	277,844	307,391	365,491	419,838
MATHEMATICAL SCIENCES	55,608	70,389	67,500	70,616	74,865	82,329	84,661	102,750	120,092	141,067
MATHEMATICS 2/..............	-	-	-	35,587	36,486	37,922	41,330	50,140	56,248	64,253
COMPUTER SCIENCES 2/.......	-	-	-	35,029	38,379	44,407	43,331	52,610	63,844	76,814
LIFE SCIENCES	1,021,373	1,181,772	1,300,592	1,506,802	1,606,002	1,881,745	2,081,626	2,233,312	2,512,456	2,784,631
BIOLOGICAL SCIENCES	477,614	537,253	435,296	547,007	500,392	619,814	700,133	757,734	843,075	934,654
AGRICULTURAL SCIENCES 3/...	-	-	225,299	274,732	335,840	377,274	406,359	453,787	490,326	555,006
MEDICAL SCIENCES	475,612	547,083	584,676	635,919	713,870	809,864	895,718	947,618	1,093,499	1,211,723
OTHER, N.E.C.	68,147	97,436	63,321	49,144	55,900	74,793	79,416	74,173	85,556	83,248
PSYCHOLOGY	53,881	56,280	65,932	70,065	70,142	73,930	74,616	81,583	85,921	93,139
SOCIAL SCIENCES	159,607	161,627	191,538	213,118	223,081	238,743	247,436	252,466	261,504	278,062
ECONOMICS	33,968	37,709	44,659	45,772	46,141	54,016	64,346	70,084	77,465	83,086
POLITICAL SCIENCE	20,042	18,362	20,575	24,311	26,315	28,113	27,084	30,997	34,578	37,872
SOCIOLOGY	36,889	43,157	52,315	52,513	55,583	62,010	62,624	58,515	62,982	70,055
OTHER, N.E.C.	68,708	62,399	73,989	90,522	95,042	94,604	93,382	92,870	86,479	87,049
OTHER SCIENCES, N.E.C.	79,023	85,226	101,301	101,586	80,532	95,040	96,179	101,127	111,548	124,812

1/ DATA WERE NOT COLLECTED IN 1978.
2/ NOT SEPARATELY AVAILABLE PRIOR TO 1973.
3/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN BIOLOGICAL SCIENCES; ESTIMATED FOR 1972 AND 1973, BASED ON DATA COLLECTED IN 1974.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 53. FEDERALLY FINANCED R&D EXPENDITURES AT UNIVERSITIES AND COLLEGES BY CHARACTER OF WORK AND FIELD OF SCIENCE: FISCAL YEARS 1968, 1970, AND 1972-79

(DOLLARS IN THOUSANDS)

CHARACTER AND FIELD	1968	1970	1972	1973	1974	1975	1976	1977	1978 1/	1979
TOTAL	1,572,064	1,647,500	1,795,045	1,985,386	2,032,204	2,287,844	2,511,603	2,729,181	3,056,875	3,431,538
CHARACTER OF WORK: 2/										
BASIC RESEARCH	1,250,782	1,296,120	1,420,164	1,453,916	1,523,115	1,695,212	1,841,027	2,008,640	-	2,517,992
APPLIED RESEARCH AND DEVELOPMENT	321,282	351,380	374,881	531,470	509,089	592,632	670,576	720,541	-	913,546
FIELD OF SCIENCE:										
ENGINEERING	246,191	245,888	252,876	238,139	239,346	259,384	290,519	336,725	407,487	474,866
PHYSICAL SCIENCES	273,048	257,822	261,010	268,368	270,211	285,026	305,413	342,718	392,304	448,992
ASTRONOMY	21,079	15,516	16,452	17,697	17,101	19,524	18,351	23,230	26,349	26,862
CHEMISTRY	82,668	78,942	82,564	86,560	88,703	92,726	107,871	125,389	137,959	154,031
PHYSICS	156,241	144,306	136,296	145,425	146,525	149,883	156,104	171,910	199,161	236,872
OTHER, N.E.C.	13,060	19,058	25,698	18,686	17,882	22,893	23,087	22,189	28,835	31,227
ENVIRONMENTAL SCIENCES	88,691	88,127	138,719	157,551	168,495	180,655	211,566	238,240	274,794	307,493
MATHEMATICAL SCIENCES	45,610	54,338	51,938	53,685	58,107	65,108	65,808	78,178	85,344	94,534
MATHEMATICS 3/..............	-	-	-	28,756	29,396	31,228	32,882	40,632	44,130	49,043
COMPUTER SCIENCES 3/.......	-	-	-	24,929	28,711	33,980	32,926	37,546	41,214	45,491
LIFE SCIENCES	725,017	814,417	863,109	1,014,585	1,052,808	1,238,006	1,380,818	1,473,460	1,624,882	1,810,729
BIOLOGICAL SCIENCES	306,471	334,851	311,997	398,628	365,701	457,145	522,144	574,605	626,910	690,805
AGRICULTURAL SCIENCES 4/...	-	-	78,313	94,373	101,417	112,865	122,538	132,772	145,070	168,849
MEDICAL SCIENCES	381,936	431,656	438,093	486,045	543,663	613,785	677,509	712,327	791,067	890,612
OTHER, N.E.C.	36,610	47,910	34,706	35,539	42,027	54,211	58,627	53,756	61,835	60,463
PSYCHOLOGY	48,547	47,263	53,555	58,600	58,547	61,232	59,369	63,648	63,996	72,256
SOCIAL SCIENCES	100,846	94,655	111,215	132,420	136,824	141,344	138,263	138,205	140,445	153,674
ECONOMICS	17,537	17,688	20,440	22,683	22,217	26,971	29,132	31,595	37,103	40,641
POLITICAL SCIENCE	10,444	7,920	8,387	10,363	11,894	12,281	11,966	14,926	15,888	18,452
SOCIOLOGY	26,095	26,220	34,842	40,480	41,276	45,044	41,115	37,854	40,597	46,739
OTHER, N.E.C.	46,770	42,827	47,546	58,894	61,437	57,048	56,050	53,830	46,857	47,842
OTHER SCIENCES, N.E.C.	44,114	44,990	62,623	62,038	47,866	57,089	59,847	58,007	67,623	68,994

1/ ESTIMATED, BASED ON DATA COLLECTED FROM DOCTORATE-GRANTING INSTITUTIONS ONLY.
2/ DATA WERE NOT COLLECTED IN 1978.
3/ NOT SEPARATELY AVAILABLE PRIOR TO 1973.
4/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN BIOLOGICAL SCIENCES; ESTIMATED FOR 1972 AND 1973, BASED ON DATA COLLECTED IN 1974.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 54. FEDERALLY FINANCED R&D EXPENDITURES AT DOCTORATE-GRANTING INSTITUTIONS BY CHARACTER OF WORK AND FIELD OF SCIENCE: FISCAL YEARS 1968, 1970, AND 1972-79

(DOLLARS IN THOUSANDS)

CHARACTER AND FIELD	1968	1970	1972	1973	1974	1975	1976	1977	1978	1979
TOTAL	1,532,312	1,615,276	1,754,798	1,938,225	1,985,318	2,236,927	2,464,217	2,680,438	3,003,012	3,370,396
CHARACTER OF WORK: 1/										
BASIC RESEARCH	1,219,218	1,285,313	1,396,334	1,433,091	1,497,026	1,665,356	1,813,536	1,982,934	-	2,480,133
APPLIED RESEARCH AND DEVELOPMENT	313,094	329,963	358,464	505,134	488,292	571,571	650,681	697,504	-	890,263
FIELD OF SCIENCE: 2/										
ENGINEERING	213,819	209,904	210,812	234,801	237,128	256,517	286,609	332,283	402,102	469,478
PHYSICAL SCIENCES	259,232	258,954	252,741	259,714	262,961	277,391	296,826	334,490	382,962	436,998
ASTRONOMY	20,494	14,509	16,256	17,479	16,901	19,340	18,208	23,028	26,120	26,382
CHEMISTRY	76,388	75,790	79,478	83,241	85,445	88,710	103,129	120,788	132,879	149,401
PHYSICS	150,128	145,635	132,692	141,658	143,559	146,821	153,078	168,987	195,776	232,352
OTHER, N.E.C.	12,222	23,020	24,315	17,336	17,056	22,520	22,411	21,687	28,187	28,863
ENVIRONMENTAL SCIENCES	81,617	77,259	135,336	153,193	163,853	175,470	205,706	231,414	266,910	300,928
MATHEMATICAL SCIENCES	39,000	46,869	43,630	52,591	57,016	63,336	64,638	76,407	83,412	93,003
MATHEMATICS 3/..............	-	-	-	27,986	28,782	30,124	32,334	39,966	43,407	48,258
COMPUTER SCIENCES 3/.......	-	-	-	24,605	28,234	33,212	32,304	36,441	40,005	44,745
LIFE SCIENCES	694,590	762,754	847,078	1,001,737	1,037,973	1,223,115	1,366,026	1,456,499	1,606,435	1,788,707
BIOLOGICAL SCIENCES	287,003	294,735	302,484	391,752	358,742	449,548	514,694	565,033	614,035	679,491
AGRICULTURAL SCIENCES 4/...	-	-	76,504	93,093	96,623	107,443	117,413	127,891	139,826	160,375
MEDICAL SCIENCES	371,633	414,064	433,207	482,374	542,325	612,394	676,172	710,105	791,067	889,531
OTHER, N.E.C.	35,954	53,955	34,883	34,518	40,283	53,730	57,747	53,470	61,507	59,310
PSYCHOLOGY	43,540	42,916	51,187	55,802	55,563	56,925	56,846	61,504	61,844	66,684
SOCIAL SCIENCES	93,349	89,392	103,028	120,375	124,745	130,009	130,671	132,849	135,205	147,517
ECONOMICS	16,688	16,856	19,701	21,814	21,182	25,561	28,560	30,870	36,237	39,187
POLITICAL SCIENCE	9,874	6,845	8,027	9,984	11,525	11,617	11,531	14,410	15,340	18,060
SOCIOLOGY	24,311	24,919	29,600	33,206	34,570	39,416	38,926	36,585	39,223	45,491
OTHER, N.E.C.	42,476	40,772	45,700	55,371	57,468	53,415	51,654	50,984	44,405	44,779
OTHER SCIENCES, N.E.C.	42,977	43,497	61,786	60,012	46,079	54,164	56,895	54,992	64,142	67,081

1/ DATA WERE NOT COLLECTED IN 1978.
2/ DEVELOPMENT EXPENDITURES ARE NOT INCLUDED IN THE FIELD OF SCIENCE DISTRIBUTIONS FOR 1968, 1970, AND 1972.
3/ NOT SEPARATELY AVAILABLE PRIOR TO 1973.
4/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN BIOLOGICAL SCIENCES;
ESTIMATED FOR 1972 AND 1973, BASED ON DATA COLLECTED IN 1974.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 55. TOTAL AND FEDERALLY FINANCED CAPITAL EXPENDITURES FOR SCIENTIFIC ACTIVITIES AT UNIVERSITIES AND COLLEGES BY FIELD OF SCIENCE: FISCAL YEARS 1968, 1970, AND 1972-79

(DOLLARS IN THOUSANDS)

FIELD	1968	1970	1972	1973	1974	1975	1976	1977	1979 1/
ALL SOURCES, TOTAL	1,070,727	951,873	912,487	835,862	841,560	1,016,402	1,042,370	959,491	729,904
ENGINEERING	126,304	132,623	84,950	55,800	91,701	118,299	81,661	87,715	95,399
PHYSICAL SCIENCES	283,811	225,268	137,331	106,210	93,468	80,282	73,546	65,154	64,551
ENVIRONMENTAL SCIENCES 2/....	-	-	27,187	26,739	24,588	35,278	49,155	28,052	25,293
MATHEMATICAL SCIENCES	55,104	38,160	24,712	20,016	23,670	15,042	24,677	25,126	27,465
LIFE SCIENCES	452,707	418,472	517,941	488,705	495,078	668,715	706,848	642,408	456,477
PSYCHOLOGY	34,425	22,036	19,007	39,584	15,511	11,525	9,129	12,699	7,803
SOCIAL SCIENCES	76,217	62,049	59,993	61,215	59,329	49,659	44,020	31,738	20,932
OTHER SCIENCES, N.E.C.	42,159	53,265	41,366	37,593	38,215	37,602	53,334	66,599	31,984
FEDERAL SOURCES, TOTAL	340,447	279,316	236,836	224,651	225,681	270,082	206,710	195,462	167,975
ENGINEERING	39,432	38,263	21,082	13,547	42,702	64,019	20,200	17,219	22,060
PHYSICAL SCIENCES	95,178	63,107	27,892	24,496	20,721	18,862	19,174	21,894	32,439
ENVIRONMENTAL SCIENCES 2/....	-	-	8,486	5,961	7,084	5,960	6,312	9,273	8,970
MATHEMATICAL SCIENCES	13,676	9,536	4,341	3,022	4,257	2,584	2,048	1,882	3,049
LIFE SCIENCES	150,591	142,718	152,328	161,907	139,775	169,458	153,531	137,369	92,567
PSYCHOLOGY	10,342	4,848	3,663	5,119	2,536	2,245	1,967	2,398	1,767
SOCIAL SCIENCES	17,627	10,303	10,939	5,369	4,467	2,755	1,806	2,086	2,069
OTHER SCIENCES, N.E.C.	13,601	10,541	8,105	5,230	4,139	4,199	1,672	3,341	5,054
OTHER SOURCES, TOTAL	730,280	672,557	675,651	611,211	615,879	746,320	835,660	764,029	561,929
ENGINEERING	86,872	94,360	63,868	42,253	48,999	54,280	61,461	70,496	73,339
PHYSICAL SCIENCES	188,633	162,161	109,439	81,714	72,747	61,420	54,372	43,260	32,112
ENVIRONMENTAL SCIENCES 2/....	-	-	18,701	20,778	17,504	29,318	42,843	18,779	16,323
MATHEMATICAL SCIENCES	41,428	28,624	20,371	16,994	19,413	12,458	22,629	23,244	24,416
LIFE SCIENCES	302,116	275,754	365,613	326,798	355,303	499,257	553,317	505,039	363,910
PSYCHOLOGY	24,083	17,188	15,344	34,465	12,975	9,280	7,162	10,301	6,036
SOCIAL SCIENCES	58,590	51,746	49,054	55,846	54,862	46,904	42,214	29,652	18,863
OTHER SCIENCES, N.E.C.	28,558	42,724	33,261	32,363	34,076	33,403	51,662	63,258	26,930

1/ DATA WERE NOT COLLECTED IN 1978.
2/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN PHYSICAL SCIENCES.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 56. TOTAL AND FEDERALLY FINANCED CAPITAL EXPENDITURES FOR SCIENTIFIC ACTIVITIES AT DOCTORATE-GRANTING INSTITUTIONS BY FIELD OF SCIENCE: FISCAL YEARS 1968, 1970, AND 1972-79

(DOLLARS IN THOUSANDS)

FIELD	1968	1970	1972	1973	1974	1975	1976	1977	1979 1/
ALL SOURCES, TOTAL	759,322	735,333	813,070	760,739	757,818	894,325	973,926	896,032	699,595
ENGINEERING	82,537	95,834	67,761	50,691	58,607	63,199	69,893	84,558	91,255
PHYSICAL SCIENCES	180,260	161,034	111,672	89,253	86,760	68,757	64,930	57,182	58,519
ENVIRONMENTAL SCIENCES 2/....	-	-	20,414	23,584	22,117	26,712	42,548	25,811	24,159
MATHEMATICAL SCIENCES	34,324	26,150	18,639	18,219	21,493	11,317	18,245	21,404	23,263
LIFE SCIENCES	364,396	363,258	496,369	465,101	477,274	645,575	686,989	607,105	450,023
PSYCHOLOGY	12,270	11,971	15,570	36,662	14,063	10,206	8,112	7,917	6,886
SOCIAL SCIENCES	52,559	40,694	51,441	56,035	53,176	42,425	36,511	29,742	18,428
OTHER SCIENCES, N.E.C.	32,976	36,392	31,204	21,194	24,328	26,134	46,698	62,313	27,062
FEDERAL SOURCES, TOTAL	263,355	223,330	220,514	212,164	190,330	212,298	196,743	188,179	163,821
ENGINEERING	29,192	25,381	16,538	12,572	11,899	13,121	14,827	16,860	21,657
PHYSICAL SCIENCES	70,358	46,600	23,638	22,156	19,906	18,181	18,290	20,815	31,165
ENVIRONMENTAL SCIENCES 2/....	-	-	8,059	5,629	6,678	5,726	6,124	8,997	8,531
MATHEMATICAL SCIENCES	7,520	6,712	3,957	2,707	3,932	1,669	1,832	1,707	2,803
LIFE SCIENCES	130,963	126,599	149,587	154,469	137,782	167,492	150,792	132,898	91,087
PSYCHOLOGY	2,730	2,845	3,163	4,587	2,474	2,092	1,809	1,668	1,569
SOCIAL SCIENCES	11,110	6,963	8,814	5,060	3,772	2,156	1,518	1,988	2,004
OTHER SCIENCES, N.E.C.	11,482	8,230	6,758	4,984	3,887	1,861	1,551	3,246	5,005
OTHER SOURCES, TOTAL	495,967	512,003	592,556	548,575	567,488	682,027	777,183	707,853	535,774
ENGINEERING	53,345	70,453	51,223	38,119	46,708	50,078	55,066	67,698	69,598
PHYSICAL SCIENCES	109,902	114,434	88,034	67,097	66,854	50,576	46,640	36,367	27,354
ENVIRONMENTAL SCIENCES 2/....	-	-	12,355	17,955	15,439	20,986	36,424	16,814	15,628
MATHEMATICAL SCIENCES	26,804	19,438	14,682	15,512	17,561	9,648	16,413	19,697	20,460
LIFE SCIENCES	233,433	236,659	346,782	310,632	339,492	478,083	536,197	474,207	358,936
PSYCHOLOGY	9,540	9,126	12,407	32,075	11,589	8,114	6,303	6,249	5,317
SOCIAL SCIENCES	41,449	33,731	42,627	50,975	49,404	40,269	34,993	27,754	16,424
OTHER SCIENCES, N.E.C.	21,494	28,162	24,446	16,210	20,441	24,273	45,147	59,067	22,057

1/ DATA WERE NOT COLLECTED IN 1978.
2/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN PHYSICAL SCIENCES.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 57. R&D EXPENDITURES AT UNIVERSITY-ADMINISTERED FEDERALLY-FUNDED RESEARCH AND DEVELOPMENT CENTERS: FISCAL YEARS 1968, 1970, AND 1972-79

(DOLLARS IN THOUSANDS)

FISCAL YEAR	ALL FFRDC'S		17 MATCHED FFRDC'S 1/	
	CURRENT DOLLARS	CONSTANT DOLLARS 2/	CURRENT DOLLARS	CONSTANT DOLLARS 2/
1968	718,930	873,548	635,674	772,386
1970	736,847	810,613	656,575	722,305
1972	753,243	753,243	687,028	687,028
1973	816,923	782,493	748,867	717,306
1974	865,098	768,976	790,649	702,799
1975	986,736	791,923	911,100	731,220
1976	1,146,712	860,895	1,066,520	800,691
1977	1,383,814	971,779	1,296,618	910,546
1978	1,716,911	1,129,547	1,712,657	1,126,748
1979	1,934,797	1,171,185	1,928,563	1,167,411

1/ THESE 17 FFRDC'S WERE IN EXISTENCE THROUGHOUT THE PERIOD.
2/ BASED ON THE GNP IMPLICIT PRICE DEFLATOR IN 1972 DOLLARS.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 58. R&D EXPENDITURES AT UNIVERSITY-ADMINISTERED FEDERALLY-FUNDED RESEARCH AND DEVELOPMENT CENTERS BY CHARACTER OF WORK AND FIELD OF SCIENCE: FISCAL YEARS 1968, 1970, AND 1972-79

(DOLLARS IN THOUSANDS)

CHARACTER AND FIELD	1968	1970	1972	1973	1974	1975	1976	1977	1978	1979
TOTAL	718,930	736,847	753,243	816,923	865,098	986,736	1,146,712	1,383,814	1,716,911	1,934,797
CHARACTER OF WORK: 1/										
BASIC RESEARCH	275,595	268,732	243,870	296,492	285,082	309,195	358,811	402,168	-	718,303
APPLIED RESEARCH AND DEVELOPMENT	443,335	468,115	509,373	520,431	580,016	677,541	787,901	981,646	-	1,216,494
FIELD OF SCIENCE:										
ENGINEERING	178,945	189,060	195,393	251,539	259,080	275,682	299,683	380,420	522,213	561,083
PHYSICAL SCIENCES	410,362	428,189	426,027	425,107	455,418	523,160	622,887	736,802	854,455	1,003,562
ASTRONOMY	27,330	19,765	28,089	28,055	29,944	31,153	32,452	41,500	38,452	46,099
CHEMISTRY	61,718	71,229	74,375	73,114	64,920	69,658	96,268	111,564	97,529	101,142
PHYSICS	306,294	317,549	305,086	318,002	268,187	322,464	376,632	447,110	568,040	584,519
OTHER, N.E.C.	15,020	19,646	18,477	5,936	92,367	99,885	117,535	136,628	150,434	271,802
ENVIRONMENTAL SCIENCES	27,875	26,970	36,684	40,647	47,864	63,175	77,476	100,981	128,217	141,100
MATHEMATICAL SCIENCES	37,147	38,213	41,174	53,178	54,339	62,416	71,641	78,584	119,203	126,850
MATHEMATICS 2/..............	-	-	-	14,744	16,002	17,715	22,063	15,358	8,100	6,614
COMPUTER SCIENCES 2/........	-	-	-	38,434	38,337	44,701	49,578	63,226	111,103	120,236
LIFE SCIENCES	32,602	34,176	35,054	33,964	34,367	42,284	50,198	57,949	58,439	73,441
BIOLOGICAL SCIENCES	26,352	26,804	28,810	24,344	26,211	31,661	38,253	43,569	48,154	62,659
AGRICULTURAL SCIENCES 3/...	-	-	0	35	0	0	0	354	1,206	1,551
MEDICAL SCIENCES	5,634	6,753	3,656	3,312	3,877	4,963	5,081	4,761	7,963	7,179
OTHER, N.E.C.	616	619	3,388	6,273	4,279	5,660	6,864	9,265	1,116	2,052
PSYCHOLOGY	5,661	1,506	1428	898	850	306	92	87	103	110
SOCIAL SCIENCES	8,945	5,059	8,568	169	330	795	1,288	3,301	5,119	5,861
ECONOMICS	149	20	0	0	14	795	1,277	3,280	3,875	3,735
POLITICAL SCIENCE	336	220	89	0	0	0	0	0	1,244	2,126
SOCIOLOGY	604	102	54	169	316	0	0	0	0	0
OTHER, N.E.C.	7,856	4,717	8,425	0	0	0	11	21	0	0
OTHER SCIENCES, N.E.C.	17,393	13,674	8,115	11,421	12,850	18,918	23,447	25,690	29,162	22,790

1/ DATA WERE NOT COLLECTED IN 1978.
2/ NOT SEPARATELY AVAILABLE PRIOR TO 1973.
3/ NOT SEPARATELY AVAILABLE PRIOR TO 1972, INCLUDED IN BIOLOGICAL SCIENCES; ESTIMATED FOR 1972 AND 1973, BASED ON DATA COLLECTED IN 1974.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 59. POSTDOCTORATES IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD OF SCIENCE: 1974-79

FIELD OF SCIENCE	1974	1975	1976	1977	1979
TOTAL, ALL FIELDS	16,660	17,034	18,653	19,753	18,569
ENGINEERING	1,029	1,169	1,204	1,230	1,073
AERONAUTICAL	33	38	39	48	28
AGRICULTURAL	28	38	44	27	33
BIOMEDICAL	25	35	51	67	28
CHEMICAL	186	233	233	227	208
CIVIL	78	98	97	134	113
ELECTRICAL	175	169	173	168	135
ENGINEERING SCIENCE	141	116	97	107	80
INDUSTRIAL	46	42	18	20	8
MECHANICAL	75	93	158	146	128
METALLURGICAL/MATERIALS	173	212	214	210	220
MINING	10	13	16	14	7
NUCLEAR	20	41	32	21	20
PETROLEUM	3	1	2	5	6
ENGINEERING, N.E.C.	36	36	30	36	59
PHYSICAL SCIENCES	3,853	3,925	4,033	4,191	4,028
ASTRONOMY	147	103	131	155	117
CHEMISTRY	2,365	2,497	2,592	2,643	2,599
PHYSICS	1,337	1,319	1,309	1,392	1,310
PHYSICAL SCIENCES, N.E.C.	4	6	1	1	2
ENVIRONMENTAL SCIENCES	294	300	403	388	329
ATMOSPHERIC SCIENCES	58	48	63	62	46
GEOSCIENCES	151	167	254	234	205
OCEANOGRAPHY	63	62	62	69	55
ENVIRONMENTAL SCIENCES, N.E.C.	22	23	24	23	23
MATHEMATICAL SCIENCES	146	166	187	145	203
COMPUTER SCIENCE	54	38	60	59	38
MATHEMATICS AND APPLIED MATHEMATICS	78	101	104	70	142
STATISTICS	14	27	23	16	23
LIFE SCIENCES	10,572	10,816	12,082	13,011	12,089
AGRICULTURAL SCIENCES	296	291	370	334	239
BIOLOGICAL SCIENCES	5,245	5,730	6,199	6,414	6,719
ANATOMY	218	198	179	223	265
BIOCHEMISTRY	1,368	1,349	1,419	1,406	1,503
BIOLOGY	711	771	817	833	928
BIOMETRY/EPIDEMIOLOGY	21	17	22	50	38
BIOPHYSICS	182	223	241	233	139
BOTANY	130	138	135	145	137
CELL BIOLOGY	203	210	242	238	283
ECOLOGY	3	32	10	11	11
ENTOMOLOGY/PARASITOLOGY	125	131	116	113	104
GENETICS	193	195	200	204	222
MICROBIOLOGY	602	674	770	840	847
NUTRITION	94	159	167	169	170
PATHOLOGY	319	385	471	521	498
PHARMACOLOGY	358	423	518	540	582
PHYSIOLOGY	481	515	565	597	672
ZOOLOGY	151	193	201	157	175
BIOSCIENCES, N.E.C.	86	117	126	134	145
HEALTH SCIENCES	5,031	4,795	5,513	6,263	5,131
ANESTHESIOLOGY	102	95	64	75	58
CARDIOLOGY	517	477	498	510	295
CLINICAL PHARMACOLOGY	56	59	43	79	43
DENTISTRY	36	31	102	366	139
ENDOCRINOLOGY	238	156	237	225	142
GASTROENTEROLOGY	200	184	171	201	103
HEMATOLOGY	236	202	276	261	151
NEUROLOGY	213	170	195	255	270
NURSING	0	16	1	0	7
OBSTETRICS/GYNECOLOGY	199	174	186	172	164
OPHTHALMOLOGY	92	104	163	186	148
OTORHINOLARYNGOLOGY	63	42	41	30	42
PEDIATRICS	581	492	554	580	624
PHARMACEUTICAL SCIENCES	181	200	198	235	241
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	117	94	160	134	167
PSYCHIATRY	271	279	309	357	320
PULMONARY DISEASE	176	164	226	240	146
RADIOLOGY	123	160	162	175	113
SPEECH PATHOLOGY/AUDIOLOGY	13	13	16	30	26
SURGERY	315	329	402	449	301
VETERINARY SCIENCES	59	65	85	102	25
CLINICAL MEDICINE, N.E.C.	1,234	1,270	1,374	1,555	1,461
HEALTH RELATED, N.E.C.	9	19	90	46	145
PSYCHOLOGY	342	369	397	394	456
SOCIAL SCIENCES	424	293	347	394	411
AGRICULTURAL ECONOMICS	51	27	30	28	6
ANTHROPOLOGY	26	33	45	53	41
ECONOMICS (EXCEPT AGRICULTURAL)	68	44	57	66	98
GEOGRAPHY	22	7	12	9	6
HISTORY AND PHILOSOPHY OF SCIENCE	6	6	12	22	11
LINGUISTICS	49	25	35	30	39
POLITICAL SCIENCE	45	20	31	32	36
SOCIOLOGY	123	84	114	100	121
SOCIOLOGY/ANTHROPOLOGY	6	2	3	4	4
SOCIAL SCIENCES, N.E.C.	28	45	8	50	49

NOTE: DATA FOR 1978 ARE NOT AVAILABLE.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 60. POSTDOCTORATES SUPPORTED BY FEDERAL SOURCES IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD OF SCIENCE: 1974-79

FIELD OF SCIENCE	1974	1975	1976	1977	1979
TOTAL, ALL FIELDS	11,797	12,019	13,166	13,494	13,823
ENGINEERING	705	807	857	925	771
AERONAUTICAL	19	26	33	39	23
AGRICULTURAL	8	20	23	15	18
BIOMEDICAL	22	26	34	41	27
CHEMICAL	117	136	160	173	144
CIVIL	49	55	71	90	78
ELECTRICAL	121	128	128	137	93
ENGINEERING SCIENCE	130	99	85	91	75
INDUSTRIAL	14	24	9	8	4
MECHANICAL	47	66	102	109	96
METALLURGICAL/MATERIALS	136	161	159	171	151
MINING	10	11	15	13	6
NUCLEAR	9	27	17	10	6
PETROLEUM	1	0	2	4	6
ENGINEERING, N.E.C.	22	28	19	24	44
PHYSICAL SCIENCES	3,060	3,114	3,272	3,411	3,326
ASTRONOMY	114	76	97	115	89
CHEMISTRY	1,780	1,874	2,024	2,098	2,142
PHYSICS	1,162	1,164	1,151	1,198	1,095
PHYSICAL SCIENCES, N.E.C.	4	0	0	0	0
ENVIRONMENTAL SCIENCES	237	227	308	316	263
ATMOSPHERIC SCIENCES	53	42	60	59	44
GEOSCIENCES	112	126	193	196	163
OCEANOGRAPHY	56	42	40	49	41
ENVIRONMENTAL SCIENCES, N.E.C.	16	17	15	12	15
MATHEMATICAL SCIENCES	94	70	89	91	106
COMPUTER SCIENCE	39	26	39	51	26
MATHEMATICS AND APPLIED MATHEMATICS	46	32	[illegible]	35	69
STATISTICS	9	12	6	5	11
LIFE SCIENCES	7,302	7,436	8,223	8,290	8,835
AGRICULTURAL SCIENCES	160	134	207	183	137
BIOLOGICAL SCIENCES	3,945	4,371	4,853	4,873	5,378
ANATOMY	149	150	134	159	207
BIOCHEMISTRY	1,059	1,101	1,145	1,146	1,198
BIOLOGY	502	527	655	610	719
BIOMETRY/EPIDEMIOLOGY	12	12	16	32	29
BIOPHYSICS	151	190	212	211	118
BOTANY	91	67	71	93	89
CELL BIOLOGY	166	178	205	178	208
ECOLOGY	2	28	8	9	11
ENTOMOLOGY/PARASITOLOGY	83	67	85	78	78
GENETICS	152	151	155	159	196
MICROBIOLOGY	448	501	588	622	690
NUTRITION	65	101	99	116	130
PATHOLOGY	237	287	358	367	415
PHARMACOLOGY	285	361	423	429	479
PHYSIOLOGY	371	411	465	466	549
ZOOLOGY	123	167	150	107	140
BIOSCIENCES, N.E.C.	49	72	84	91	122
HEALTH SCIENCES	3,197	2,931	3,163	3,234	3,320
ANESTHESIOLOGY	46	37	43	33	25
CARDIOLOGY	333	287	266	238	164
CLINICAL PHARMACOLOGY	35	43	32	53	31
DENTISTRY	9	11	45	62	48
ENDOCRINOLOGY	149	100	146	127	95
GASTROENTEROLOGY	141	101	88	96	41
HEMATOLOGY	156	144	180	172	111
NEUROLOGY	157	132	127	149	189
NURSING	0	16	1	0	6
OBSTETRICS/GYNECOLOGY	94	83	80	78	76
OPHTHALMOLOGY	50	64	108	132	103
OTORHINOLARYNGOLOGY	47	31	17	17	28
PEDIATRICS	364	298	322	290	382
PHARMACEUTICAL SCIENCES	155	174	163	171	199
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	75	74	103	92	124
PSYCHIATRY	212	196	195	229	245
PULMONARY DISEASE	101	83	109	105	85
RADIOLOGY	79	115	140	100	77
SPEECH PATHOLOGY/AUDIOLOGY	13	9	14	17	24
SURGERY	188	184	208	212	195
VETERINARY SCIENCES	43	45	43	57	15
CLINICAL MEDICINE, N.E.C.	742	685	690	761	945
HEALTH RELATED, N.E.C.	8	19	43	43	112
PSYCHOLOGY	188	219	254	235	284
SOCIAL SCIENCES	211	146	163	186	238
AGRICULTURAL ECONOMICS	35	20	23	7	3
ANTHROPOLOGY	17	19	27	24	28
ECONOMICS (EXCEPT AGRICULTURAL)	38	15	14	13	35
GEOGRAPHY	7	2	1	4	3
HISTORY AND PHILOSOPHY OF SCIENCE	1	1	1	6	2
LINGUISTICS	13	12	11	7	13
POLITICAL SCIENCE	12	5	11	14	20
SOCIOLOGY	72	50	67	73	95
SOCIOLOGY/ANTHROPOLOGY	2	0	0	1	4
SOCIAL SCIENCES, N.E.C.	14	22	8	37	35

NOTE: DATA FOR 1978 ARE NOT AVAILABLE.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 61. POSTDOCTORATES SUPPORTED BY NON-FEDERAL SOURCES IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD OF SCIENCE: 1974-79

FIELD OF SCIENCE	1974	1975	1976	1977	1979
TOTAL, ALL FIELDS	4,863	5,015	5,487	6,299	4,766
ENGINEERING	324	358	347	305	302
AERONAUTICAL	14	12	6	9	5
AGRICULTURAL	20	18	21	12	15
BIOMEDICAL	3	9	17	26	1
CHEMICAL	69	97	73	54	64
CIVIL	29	43	26	44	35
ELECTRICAL	54	41	45	31	42
ENGINEERING SCIENCE	11	17	12	16	5
INDUSTRIAL	32	18	9	12	4
MECHANICAL	28	27	56	37	32
METALLURGICAL/MATERIALS	37	51	55	39	69
MINING	0	2	1	1	1
NUCLEAR	11	14	15	11	14
PETROLEUM	2	1	0	1	0
ENGINEERING, N.E.C.	14	8	11	12	15
PHYSICAL SCIENCES	793	811	761	780	702
ASTRONOMY	33	27	34	40	28
CHEMISTRY	585	623	568	545	457
PHYSICS	175	155	158	194	215
PHYSICAL SCIENCES, N.E.C.	0	6	1	1	2
ENVIRONMENTAL SCIENCES	57	73	95	72	66
ATMOSPHERIC SCIENCES	5	6	3	3	2
GEOSCIENCES	39	41	61	38	42
OCEANOGRAPHY	7	20	22	20	14
ENVIRONMENTAL SCIENCES, N.E.C.	6	6	9	11	8
MATHEMATICAL SCIENCES	52	96	98	54	97
COMPUTER SCIENCE	15	12	21	8	12
MATHEMATICS AND APPLIED MATHEMATICS	32	69	60	35	73
STATISTICS	5	15	17	11	12
LIFE SCIENCES	3,270	3,380	3,859	4,721	3,254
AGRICULTURAL SCIENCES	136	157	163	151	102
BIOLOGICAL SCIENCES	1,300	1,359	1,346	1,541	1,341
ANATOMY	69	48	45	64	58
BIOCHEMISTRY	309	248	274	260	305
BIOLOGY	209	244	162	223	209
BIOMETRY/EPIDEMIOLOGY	9	5	6	18	9
BIOPHYSICS	31	33	29	22	21
BOTANY	39	71	64	52	48
CELL BIOLOGY	37	32	37	60	75
ECOLOGY	1	4	2	2	0
ENTOMOLOGY/PARASITOLOGY	42	64	31	35	26
GENETICS	41	44	45	45	26
MICROBIOLOGY	154	173	182	218	157
NUTRITION	29	58	68	53	40
PATHOLOGY	82	98	113	154	83
PHARMACOLOGY	73	62	95	111	103
PHYSIOLOGY	110	104	100	131	123
ZOOLOGY	28	26	51	50	35
BIOSCIENCES, N.E.C.	37	45	42	43	23
HEALTH SCIENCES	1,834	1,864	2,350	3,029	1,811
ANESTHESIOLOGY	56	58	21	42	33
CARDIOLOGY	184	190	232	272	131
CLINICAL PHARMACOLOGY	21	16	11	26	12
DENTISTRY	27	20	57	304	91
ENDOCRINOLOGY	89	56	91	98	47
GASTROENTEROLOGY	59	83	83	109	62
HEMATOLOGY	80	58	96	89	40
NEUROLOGY	56	38	68	106	81
NURSING	0	0	0	0	1
OBSTETRICS/GYNECOLOGY	105	91	106	94	88
OPHTHALMOLOGY	42	40	55	54	45
OTORHINOLARYNGOLOGY	16	11	24	13	14
PEDIATRICS	217	194	232	290	242
PHARMACEUTICAL SCIENCES	26	26	35	64	42
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	42	20	57	42	43
PSYCHIATRY	59	83	114	128	75
PULMONARY DISEASE	75	81	117	135	61
RADIOLOGY	44	45	22	75	36
SPEECH PATHOLOGY/AUDIOLOGY	0	4	2	13	2
SURGERY	127	145	194	237	106
VETERINARY SCIENCES	16	20	42	45	10
CLINICAL MEDICINE, N.E.C.	492	505	684	794	516
HEALTH RELATED, N.E.C.	1	0	7	3	33
PSYCHOLOGY	154	150	143	159	172
SOCIAL SCIENCES	213	107	184	208	173
AGRICULTURAL ECONOMICS	16	7	7	21	3
ANTHROPOLOGY	9	14	18	29	13
ECONOMICS (EXCEPT AGRICULTURAL)	30	29	43	53	63
GEOGRAPHY	15	5	11	5	3
HISTORY AND PHILOSOPHY OF SCIENCE	5	5	11	16	9
LINGUISTICS	36	13	24	23	26
POLITICAL SCIENCE	33	15	20	18	16
SOCIOLOGY	51	34	47	27	26
SOCIOLOGY/ANTHROPOLOGY	4	2	3	3	0
SOCIAL SCIENCES, N.E.C.	14	23	0	13	14

NOTE: DATA FOR 1978 ARE NOT AVAILABLE.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 62. RESEARCH ASSISTANTS IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD OF SCIENCE: 1974-79

FIELD OF SCIENCE	1974	1975	1976	1977	1979
TOTAL, ALL FIELDS	39,611	40,147	42,728	43,914	48,497
ENGINEERING	10,995	10,897	11,259	11,792	12,684
AERONAUTICAL	559	528	485	491	501
AGRICULTURAL	237	334	319	346	387
BIOMEDICAL	156	179	175	183	190
CHEMICAL	1,296	1,364	1,429	1,482	1,696
CIVIL	1,823	1,715	1,814	1,937	1,914
ELECTRICAL	2,156	2,159	2,127	2,412	2,553
ENGINEERING SCIENCE	619	601	600	506	515
INDUSTRIAL	680	544	526	495	570
MECHANICAL	1,458	1,414	1,599	1,611	1,766
METALLURGICAL/MATERIALS	1,063	1,111	1,147	1,188	1,354
MINING	132	111	128	130	98
NUCLEAR	407	473	471	508	547
PETROLEUM	70	73	83	99	132
ENGINEERING, N.E.C.	339	291	356	404	461
PHYSICAL SCIENCES	6,436	6,460	6,799	6,781	7,740
ASTRONOMY	227	211	211	197	213
CHEMISTRY	3,066	3,192	3,485	3,542	4,051
PHYSICS	3,099	3,016	3,076	3,017	3,452
PHYSICAL SCIENCES, N.E.C.	44	41	27	25	24
ENVIRONMENTAL SCIENCES	2,618	2,778	3,141	3,192	3,452
ATMOSPHERIC SCIENCES	404	466	488	497	520
GEOSCIENCES	1,284	1,330	1,594	1,599	1,850
OCEANOGRAPHY	812	841	890	900	889
ENVIRONMENTAL SCIENCES, N.E.C.	118	141	169	196	193
MATHEMATICAL SCIENCES	1,405	1,369	1,504	1,485	1,626
COMPUTER SCIENCE	728	732	782	779	873
MATHEMATICS AND APPLIED MATHEMATICS	390	374	434	400	460
STATISTICS	287	263	288	306	293
LIFE SCIENCES	10,933	11,423	12,711	13,169	15,129
AGRICULTURAL SCIENCES	3,786	4,065	4,305	4,402	4,849
BIOLOGICAL SCIENCES	6,355	6,573	7,468	7,751	8,915
ANATOMY	51	61	80	98	168
BIOCHEMISTRY	1,029	1,010	1,159	1,219	1,422
BIOLOGY	758	834	1,010	931	1,104
BIOMETRY/EPIDEMIOLOGY	57	61	73	85	84
BIOPHYSICS	135	182	184	173	174
BOTANY	667	677	767	843	912
CELL BIOLOGY	80	76	98	126	144
ECOLOGY	155	154	206	227	217
ENTOMOLOGY/PARASITOLOGY	608	655	659	664	812
GENETICS	137	137	157	162	186
MICROBIOLOGY	593	652	726	735	892
NUTRITION	779	687	800	912	1,004
PATHOLOGY	93	87	105	90	165
PHARMACOLOGY	239	282	292	311	393
PHYSIOLOGY	247	296	346	420	414
ZOOLOGY	501	484	492	443	478
BIOSCIENCES, N.E.C.	226	238	314	312	346
HEALTH SCIENCES	792	785	938	1,016	1,365
ANESTHESIOLOGY	0	0	1	0	0
CARDIOLOGY	1	1	0	0	2
CLINICAL PHARMACOLOGY	0	0	0	0	0
DENTISTRY	0	13	32	14	34
ENDOCRINOLOGY	2	6	2	3	8
GASTROENTEROLOGY	1	0	0	0	0
HEMATOLOGY	1	0	1	4	0
NEUROLOGY	23	34	18	29	15
NURSING	22	13	10	28	75
OBSTETRICS/GYNECOLOGY	3	11	14	7	8
OPHTHALMOLOGY	10	0	0	1	0
OTORHINOLARYNGOLOGY	5	2	7	6	4
PEDIATRICS	13	7	7	2	0
PHARMACEUTICAL SCIENCES	188	171	208	243	358
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	66	84	111	100	149
PSYCHIATRY	10	6	2	1	26
PULMONARY DISEASE	3	0	0	0	0
RADIOLOGY	42	64	77	52	51
SPEECH PATHOLOGY/AUDIOLOGY	153	127	165	186	198
SURGERY	12	4	10	9	0
VETERINARY SCIENCES	133	143	183	253	233
CLINICAL MEDICINE, N.E.C.	47	22	37	27	26
HEALTH RELATED, N.E.C.	57	77	53	51	176
PSYCHOLOGY	2,289	2,208	2,244	2,293	2,333
SOCIAL SCIENCES	4,935	5,012	5,070	5,202	5,533
AGRICULTURAL ECONOMICS	816	893	880	959	985
ANTHROPOLOGY	350	378	339	392	374
ECONOMICS (EXCEPT AGRICULTURAL)	1,102	1,095	1,121	1,099	1,112
GEOGRAPHY	217	218	241	230	212
HISTORY AND PHILOSOPHY OF SCIENCE	9	2	10	12	11
LINGUISTICS	177	138	180	153	171
POLITICAL SCIENCE	870	864	863	780	955
SOCIOLOGY	977	918	1,006	1,038	927
SOCIOLOGY/ANTHROPOLOGY	106	155	98	98	97
SOCIAL SCIENCES, N.E.C.	311	351	332	441	689

NOTE: DATA FOR 1978 ARE NOT AVAILABLE.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 63. RESEARCH ASSISTANTS SUPPORTED BY FEDERAL SOURCES IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD OF SCIENCE: 1974-79

FIELD OF SCIENCE	1974	1975	1976	1977	1979
TOTAL, ALL FIELDS	22,317	23,086	24,427	25,193	27,829
ENGINEERING	6,693	6,892	7,168	7,507	7,978
AERONAUTICAL	415	395	335	367	360
AGRICULTURAL	55	99	81	127	118
BIOMEDICAL	94	112	122	104	129
CHEMICAL	715	856	894	922	958
CIVIL	958	908	990	1,032	1,130
ELECTRICAL	1,617	1,674	1,640	1,810	1,858
ENGINEERING SCIENCE	463	436	411	302	359
INDUSTRIAL	321	241	196	230	244
MECHANICAL	836	900	1,074	1,080	1,138
METALLURGICAL/MATERIALS	775	793	858	868	1,043
MINING	79	70	93	89	78
NUCLEAR	164	191	216	248	268
PETROLEUM	11	12	19	41	40
ENGINEERING, N.E.C.	190	205	239	287	255
PHYSICAL SCIENCES	5,375	5,508	5,696	5,737	6,407
ASTRONOMY	187	174	181	158	171
CHEMISTRY	2,375	2,629	2,791	2,838	3,192
PHYSICS	2,795	2,690	2,716	2,726	3,033
PHYSICAL SCIENCES, N.E.C.	18	15	8	15	11
ENVIRONMENTAL SCIENCES	1,922	2,043	2,253	2,297	2,629
ATMOSPHERIC SCIENCES	333	378	444	466	494
GEOSCIENCES	922	979	1,083	1,136	1,375
OCEANOGRAPHY	586	619	624	610	657
ENVIRONMENTAL SCIENCES, N.E.C.	81	67	102	85	103
MATHEMATICAL SCIENCES	810	743	776	857	996
COMPUTER SCIENCE	456	441	410	494	614
MATHEMATICS AND APPLIED MATHEMATICS	210	205	245	222	271
STATISTICS	144	97	121	141	111
LIFE SCIENCES	5,067	5,442	6,119	6,213	7,163
AGRICULTURAL SCIENCES	1,274	1,439	1,468	1,491	1,605
BIOLOGICAL SCIENCES	3,407	3,578	4,199	4,235	4,938
ANATOMY	27	33	55	65	91
BIOCHEMISTRY	699	644	811	848	995
BIOLOGY	444	530	685	577	774
BIOMETRY/EPIDEMIOLOGY	35	45	48	56	53
BIOPHYSICS	99	136	139	131	128
BOTANY	239	265	287	334	388
CELL BIOLOGY	58	61	52	85	102
ECOLOGY	63	81	97	102	111
ENTOMOLOGY/PARASITOLOGY	233	238	245	236	214
GENETICS	64	86	84	78	92
MICROBIOLOGY	385	421	477	453	631
NUTRITION	319	285	345	342	391
PATHOLOGY	57	52	52	53	84
PHARMACOLOGY	132	162	160	170	193
PHYSIOLOGY	131	148	174	235	213
ZOOLOGY	284	261	300	245	286
BIOSCIENCES, N.E.C.	138	130	188	205	192
HEALTH SCIENCES	386	425	452	487	620
ANESTHESIOLOGY	0	0	1	0	0
CARDIOLOGY	1	1	0	0	2
CLINICAL PHARMACOLOGY	0	0	0	0	0
DENTISTRY	0	5	12	5	18
ENDOCRINOLOGY	2	3	2	3	7
GASTROENTEROLOGY	1	0	0	0	0
HEMATOLOGY	1	0	0	0	0
NEUROLOGY	19	28	12	18	10
NURSING	13	1	1	11	36
OBSTETRICS/GYNECOLOGY	0	8	14	6	6
OPHTHALMOLOGY	5	0	0	0	0
OTORHINOLARYNGOLOGY	5	2	5	5	4
PEDIATRICS	11	6	7	2	0
PHARMACEUTICAL SCIENCES	101	99	141	148	181
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	43	41	55	55	59
PSYCHIATRY	1	8	1	0	24
PULMONARY DISEASE	1	0	0	0	0
RADIOLOGY	30	48	48	36	27
SPEECH PATHOLOGY/AUDIOLOGY	62	57	53	73	87
SURGERY	10	1	8	9	0
VETERINARY SCIENCES	32	59	51	76	70
CLINICAL MEDICINE, N.E.C.	32	17	17	16	20
HEALTH RELATED, N.E.C.	16	42	24	24	69
PSYCHOLOGY	1,042	1,004	970	1,029	1,147
SOCIAL SCIENCES	1,408	1,454	1,445	1,553	1,509
AGRICULTURAL ECONOMICS	271	299	282	357	323
ANTHROPOLOGY	110	156	118	114	127
ECONOMICS (EXCEPT AGRICULTURAL)	286	292	229	269	281
GEOGRAPHY	85	98	79	66	64
HISTORY AND PHILOSOPHY OF SCIENCE	0	0	3	5	2
LINGUISTICS	91	68	115	90	68
POLITICAL SCIENCE	97	94	108	101	110
SOCIOLOGY	307	334	346	350	307
SOCIOLOGY/ANTHROPOLOGY	33	43	27	25	23
SOCIAL SCIENCES, N.E.C.	128	110	138	176	204

NOTE: DATA FOR 1978 ARE NOT AVAILABLE.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 64. RESEARCH ASSISTANTS SUPPORTED BY NON-FEDERAL SOURCES IN DOCTORATE-GRANTING INSTITUTIONS BY FIELD OF SCIENCE: 1974-79

FIELD OF SCIENCE	1974	1975	1976	1977	1979
TOTAL, ALL FIELDS	17,294	17,061	18,301	18,721	20,668
ENGINEERING	4,302	4,005	4,091	4,285	4,706
AERONAUTICAL	144	133	190	124	141
AGRICULTURAL	182	235	238	219	269
BIOMEDICAL	62	67	53	79	61
CHEMICAL	581	508	535	560	738
CIVIL	865	807	824	905	784
ELECTRICAL	539	485	487	602	695
ENGINEERING SCIENCE	156	165	189	204	156
INDUSTRIAL	359	303	330	265	326
MECHANICAL	622	514	525	531	628
METALLURGICAL/MATERIALS	288	318	299	320	311
MINING	53	41	35	41	20
NUCLEAR	243	282	255	260	279
PETROLEUM	59	61	64	58	92
ENGINEERING, N.E.C.	149	86	117	117	206
PHYSICAL SCIENCES	1,061	952	1,103	1,044	1,333
ASTRONOMY	40	37	30	39	42
CHEMISTRY	691	563	694	704	859
PHYSICS	304	326	360	291	419
PHYSICAL SCIENCES, N.E.C.	26	26	19	10	13
ENVIRONMENTAL SCIENCES	696	735	888	895	823
ATMOSPHERIC SCIENCES	71	88	44	31	26
GEOSCIENCES	362	351	511	463	475
OCEANOGRAPHY	226	222	266	290	232
ENVIRONMENTAL SCIENCES, N.E.C.	37	74	67	111	90
MATHEMATICAL SCIENCES	595	626	728	628	630
COMPUTER SCIENCE	272	291	372	285	259
MATHEMATICS AND APPLIED MATHEMATICS	180	169	189	178	189
STATISTICS	143	166	167	165	182
LIFE SCIENCES	5,866	5,981	6,592	6,956	7,966
AGRICULTURAL SCIENCES	2,512	2,626	2,837	2,911	3,244
BIOLOGICAL SCIENCES	2,948	2,995	3,269	3,516	3,977
ANATOMY	24	28	25	33	77
BIOCHEMISTRY	330	366	349	371	427
BIOLOGY	314	304	325	334	330
BIOMETRY/EPIDEMIOLOGY	22	16	25	29	31
BIOPHYSICS	36	46	45	42	46
BOTANY	428	412	480	509	524
CELL BIOLOGY	22	15	46	41	42
ECOLOGY	92	73	109	125	106
ENTOMOLOGY/PARASITOLOGY	375	417	414	428	598
GENETICS	73	51	73	84	94
MICROBIOLOGY	208	231	249	282	261
NUTRITION	460	402	455	570	613
PATHOLOGY	36	35	53	37	81
PHARMACOLOGY	107	120	132	141	200
PHYSIOLOGY	116	148	172	185	201
ZOOLOGY	217	223	192	198	192
BIOSCIENCES, N.E.C.	88	108	126	107	154
HEALTH SCIENCES	406	360	486	529	745
ANESTHESIOLOGY	0	0	0	0	0
CARDIOLOGY	0	0	0	0	0
CLINICAL PHARMACOLOGY	0	0	0	0	0
DENTISTRY	0	8	20	9	18
ENDOCRINOLOGY	0	3	0	0	1
GASTROENTEROLOGY	0	0	0	0	0
HEMATOLOGY	0	0	1	4	0
NEUROLOGY	4	6	6	11	5
NURSING	9	12	9	17	39
OBSTETRICS/GYNECOLOGY	3	3	0	1	2
OPHTHALMOLOGY	5	0	0	1	0
OTORHINOLARYNGOLOGY	0	0	2	1	0
PEDIATRICS	2	1	0	0	0
PHARMACEUTICAL SCIENCES	87	72	87	95	177
PREVENTIVE MEDICINE/ COMMUNITY HEALTH	23	43	56	45	90
PSYCHIATRY	9	0	1	1	2
PULMONARY DISEASE	2	0	0	0	0
RADIOLOGY	12	15	29	16	24
SPEECH PATHOLOGY/AUDIOLOGY	91	70	112	113	111
SURGERY	2	3	2	0	0
VETERINARY SCIENCES	101	84	132	177	163
CLINICAL MEDICINE, N.E.C.	15	5	20	11	6
HEALTH RELATED, N.E.C.	41	35	29	27	107
PSYCHOLOGY	1,247	1,204	1,274	1,264	1,186
SOCIAL SCIENCES	3,527	3,558	3,625	3,649	4,024
AGRICULTURAL ECONOMICS	545	594	598	602	662
ANTHROPOLOGY	240	222	221	278	247
ECONOMICS (EXCEPT AGRICULTURAL)	816	803	892	830	831
GEOGRAPHY	132	160	162	164	148
HISTORY AND PHILOSOPHY OF SCIENCE	9	2	7	7	9
LINGUISTICS	86	70	65	63	103
POLITICAL SCIENCE	773	770	755	679	845
SOCIOLOGY	670	584	660	688	620
SOCIOLOGY/ANTHROPOLOGY	73	112	71	73	74
SOCIAL SCIENCES, N.E.C.	183	241	194	265	485

NOTE: DATA FOR 1978 ARE NOT AVAILABLE.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 65. FULL-TIME EQUIVALENT R&D SCIENTISTS AND ENGINEERS EMPLOYED IN UNIVERSITIES AND COLLEGES: 1969 AND 1972-80

YEAR	NUMBER OF R&D FTE'S	AVERAGE ANNUAL RATE OF CHANGE FROM PRECEDING YEAR
1969	50,400	-
1972	48,900	-1.0
1973	46,900	-4.1
1974	48,000	2.3
1975	51,600	7.5
1976	52,900	2.5
1977	54,400	2.8
1978	55,919	2.8
1980	57,116	1.1

SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 66. FULL-TIME EQUIVALENT R&D SCIENTISTS AND ENGINEERS EMPLOYED IN UNIVERSITIES AND COLLEGES BY FIELD OF EMPLOYMENT: 1969 AND 1980

FIELD OF EMPLOYMENT	1969	1980
TOTAL	50,400	57,116
ENGINEERS	5,654	7,118
PHYSICAL SCIENTISTS	7,830	7,234
ENVIRONMENTAL SCIENTISTS 1/.................	-	2,690
MATHEMATICAL AND COMPUTER SCIENTISTS	1,899	2,120
LIFE SCIENTISTS	29,274	32,456
PSYCHOLOGISTS	1,427	1,658
SOCIAL SCIENTISTS	4,316	3,840

1/ INCLUDED WITH PHYSICAL SCIENTISTS IN 1969.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 67. FULL-TIME-EQUIVALENT SCIENTISTS AND ENGINEERS EMPLOYED AT UNIVERSITIES AND COLLEGES BY FIELD OF EMPLOYMENT AND TYPE OF ACTIVITY: JANUARY 1978 AND JANUARY 1980

FIELD OF EMPLOYMENT	TOTAL FTE'S		R&D FTE'S	
	1978	1980	1978	1980
TOTAL	271,560	282,173	55,919	57,116
ENGINEERS	27,552	29,190	5,894	7,118
AERONAUTICAL AND ASTRONAUTICAL ENGINEERS	1,024	1,239	290	402
CHEMICAL ENGINEERS	1,871	2,094	454	565
CIVIL ENGINEERS	4,743	4,765	713	731
ELECTRICAL ENGINEERS	6,275	7,020	1,328	1,888
MECHANICAL ENGINEERS	5,019	5,274	828	937
OTHER ENGINEERS	8,620	8,797	2,281	2,596
PHYSICAL SCIENTISTS	30,580	30,598	6,994	7,234
CHEMISTS	16,388	15,962	3,288	3,118
PHYSICISTS	12,071	12,113	2,800	3,021
ASTRONOMERS 1/	-	870	-	384
OTHER PHYSICAL SCIENTISTS	2,121	1,654	905	712
ENVIRONMENTAL SCIENTISTS	8,888	8,959	2,571	2,690
EARTH SCIENTISTS	6,520	6,054	1,391	1,181
ATMOSPHERIC SCIENTISTS	899	835	453	425
OCEANOGRAPHERS	1,469	1,431	730	845
OTHER ENVIRONMENTAL SCIENTISTS 1/	-	638	-	239
MATHEMATICAL AND COMPUTER SCIENTISTS	28,188	30,192	2,464	2,120
MATHEMATICIANS	22,460	23,015	1,615	1,333
COMPUTER SCIENTISTS	5,728	7,177	847	786
LIFE SCIENTISTS	108,877	117,635	31,057	32,456
AGRICULTURAL SCIENTISTS	14,380	14,849	4,563	5,678
BIOLOGICAL SCIENTISTS	40,706	41,348	12,356	12,318
MEDICAL SCIENTISTS	53,791	56,383	14,137	13,770
OTHER LIFE SCIENTISTS 1/	-	5,056	-	689
PSYCHOLOGISTS	20,150	19,289	2,033	1,658
SOCIAL SCIENTISTS	47,325	46,308	4,907	3,840
ECONOMISTS	12,273	12,488	1,650	1,366
SOCIOLOGISTS	13,174	12,295	1,115	804
POLITICAL SCIENTISTS	10,136	9,842	757	585
OTHER SOCIAL SCIENTISTS	11,742	11,682	1,384	1,086

1/ DATA NOT AVAILABLE PRIOR TO 1980.
NOTE: DETAIL MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING.
SOURCE: NATIONAL SCIENCE FOUNDATION

TABLE 68. FULL-TIME-EQUIVALENT SCIENTISTS AND ENGINEERS EMPLOYED AT DOCTORATE-GRANTING INSTITUTIONS BY FIELD OF EMPLOYMENT AND TYPE OF ACTIVITY: JANUARY 1978 - JANUARY 1980

FIELD OF EMPLOYMENT	TOTAL FTE'S			R&D FTE'S		
	1978	1979	1980	1978	1979	1980
TOTAL	180,736	186,545	193,589	53,317	54,432	55,433
ENGINEERS	20,059	21,115	21,884	5,656	6,967	6,969
AERONAUTICAL AND ASTRONAUTICAL ENGINEERS	779	813	1,003	278	317	394
CHEMICAL ENGINEERS	1,655	1,714	1,861	451	522	557
CIVIL ENGINEERS	3,339	3,325	3,386	674	716	711
ELECTRICAL ENGINEERS	4,142	4,591	4,930	1,262	1,763	1,840
MECHANICAL ENGINEERS	3,338	3,444	3,589	783	972	906
OTHER ENGINEERS	6,806	7,228	7,114	2,208	2,677	2,559
PHYSICAL SCIENTISTS	17,398	17,307	17,805	6,619	6,647	6,909
CHEMISTS	8,661	8,331	8,439	3,047	3,025	2,936
PHYSICISTS	7,356	7,355	7,578	2,674	2,738	2,901
ASTRONOMERS 1/	-	705	681	-	313	362
OTHER PHYSICAL SCIENTISTS	1,381	916	1,106	897	573	710
ENVIRONMENTAL SCIENTISTS	6,087	6,083	6,198	2,429	2,772	2,580
EARTH SCIENTISTS	4,020	3,642	3,775	1,294	1,190	1,102
ATMOSPHERIC SCIENTISTS	768	742	731	430	432	423
OCEANOGRAPHERS	1,299	1,487	1,282	706	1,064	827
OTHER ENVIRONMENTAL SCIENTISTS 1/	-	212	409	-	86	228
MATHEMATICAL AND COMPUTER SCIENTISTS	12,149	12,873	13,894	2,191	1,760	1,947
MATHEMATICIANS	9,319	9,561	9,967	1,430	1,052	1,204
COMPUTER SCIENTISTS	2,830	3,312	3,927	759	708	743
LIFE SCIENTISTS	91,355	95,774	100,291	30,208	31,181	31,981
AGRICULTURAL SCIENTISTS	12,302	12,771	12,805	4,346	5,384	5,554
BIOLOGICAL SCIENTISTS	28,047	28,957	29,448	11,873	11,797	12,005
MEDICAL SCIENTISTS	51,006	51,256	54,097	13,990	13,508	13,741
OTHER LIFE SCIENTISTS 1/	-	2,790	3,942	-	491	680
PSYCHOLOGISTS	8,926	8,594	8,812	1,816	1,445	1,506
SOCIAL SCIENTISTS	24,762	24,799	24,707	4,399	3,660	3,542
ECONOMISTS	6,882	7,022	7,133	1,529	1,325	1,302
SOCIOLOGISTS	5,953	5,848	5,605	968	814	700
POLITICAL SCIENTISTS	4,818	4,847	4,830	651	546	529
OTHER SOCIAL SCIENTISTS	7,109	7,082	7,137	1,251	975	1,011

1/ DATA NOT AVAILABLE PRIOR TO 1979.
NOTE: DETAIL MAY NOT ADD TO TOTAL BECAUSE OF ROUNDING.
SOURCE: NATIONAL SCIENCE FOUNDATION

Table 69. Scientists and engineers by field, labor force status, and sex: 1974, 1976, and 1978

Field	Total			Total labor force			Outside labor force		
	1974	1976	1978	1974	1976	1978	1974	1976	1978
Total, all fields	2,481,800	2,705,800	2,741,400	2,288,000	2,451,700	2,507,600	193,800	254,100	233,800
Men	2,265,000	2,455,800	2,475,300	2,104,700	2,240,000	2,270,400	180,300	215,800	204,900
Women	216,800	250,000	266,100	183,300	211,700	237,200	33,500	38,300	28,900
Physical scientists	247,900	280,600	254,600	206,500	237,300	216,700	41,400	43,300	37,900
Men	227,200	254,100	231,800	189,900	215,800	200,700	37,300	38,300	31,100
Women	20,700	26,500	22,800	16,600	21,500	16,000	4,100	5,100	6,800
Mathematical scientists	101,000	110,200	107,800	84,500	92,200	89,800	16,500	18,000	18,000
Men	81,000	87,200	88,000	70,600	76,000	71,800	10,400	11,200	16,200
Women	20,000	22,900	19,800	13,900	16,200	18,000	6,100	6,800	1,800
Computer specialists	170,000	179,900	237,500	167,100	173,500	234,600	2,900	6,400	2,900
Men	135,400	143,500	194,800	135,400	139,500	193,900	(1)	4,000	900
Women	34,600	36,400	42,700	31,700	34,000	40,600	2,900	2,400	2,100
Environmental scientists	79,000	85,700	80,800	71,500	77,400	73,900	7,500	8,300	6,900
Men	73,700	79,300	72,200	67,100	73,000	66,200	6,600	6,300	6,000
Women	5,300	6,400	8,600	4,400	4,400	7,800	900	2,000	900
Engineers	1,291,600	1,375,200	1,396,400	1,228,600	1,268,000	1,285,000	63,000	107,200	111,300
Men	1,284,900	1,366,900	1,374,600	1,224,200	1,261,000	1,264,500	60,700	105,900	110,100
Women	6,700	8,[illegible]	21,700	4,400	7,000	20,500	2,300	1,300	1,200
Life scientists	266,000	314,100	327,600	243,400	286,300	295,800	22,600	27,800	31,800
Men	214,100	253,300	255,400	197,400	232,700	231,500	16,700	20,600	23,900
Women	51,900	60,800	72,200	46,000	53,700	64,300	5,900	7,200	7,900
Psychologists	109,300	122,900	131,700	94,000	105,700	123,200	15,300	17,200	8,500
Men	84,200	92,300	95,700	73,000	80,000	91,100	11,200	12,300	4,600
Women	25,100	30,700	36,000	21,000	25,700	32,100	4,100	4,900	3,900
Social scientists	217,000	237,200	205,100	192,400	211,400	188,500	24,600	25,600	16,600
Men	164,000	179,200	162,800	147,100	162,100	150,600	16,900	17,100	12,200
Women	53,000	58,000	42,200	45,300	49,300	37,800	7,700	8,600	4,400

[1] Too few cases to estimate.

NOTE: Detail may not add to total because of rounding.

SOURCE: National Science Foundation

Table 70. Scientists and engineers by field, employment status, and sex: 1974, 1976, and 1978

Field	Total employed			In science/engineering			Outside science/engineering			Unemployed but seeking employment		
	1974	1976	1978	1974	1976	1978	1974	1976	1978	1974	1976	1978
Total, all fields	2,248,200	2,377,200	2,473,200	NA	2,090,300	2,091,900	NA	286,800	381,300	39,800	74,600	34,400
Men	2,072,100	2,179,900	2,241,700	NA	1,914,500	1,957,400	NA	265,600	284,300	32,600	60,100	28,700
Women	176,100	197,200	231,500	NA	175,900	134,600	NA	21,300	97,000	7,200	14,500	5,700
Physical scientists	201,400	227,400	212,400	NA	189,400	184,700	NA	38,000	27,600	5,100	9,900	4,300
Men	185,500	207,500	197,400	NA	176,400	174,400	NA	31,100	22,900	4,400	8,400	3,400
Women	15,900	19,900	15,000	NA	13,100	10,300	NA	6,900	4,700	700	1,500	1,000
Mathematical scientists	82,800	88,300	88,400	NA	85,700	42,900	NA	2,600	45,600	1,700	3,900	1,400
Men	69,300	72,700	70,900	NA	70,300	38,100	NA	2,300	32,700	1,300	3,300	900
Women	13,500	15,600	17,500	NA	15,300	4,800	NA	300	12,800	400	500	500
Computer specialists	166,200	172,300	234,000	NA	167,200	231,400	NA	5,200	2,500	900	1,200	600
Men	134,900	138,700	193,400	NA	134,400	191,100	NA	4,300	2,200	500	800	600
Women	31,300	33,600	40,600	NA	32,700	40,300	NA	900	300	400	400	100
Environmental scientists	69,100	74,800	72,200	NA	52,000	62,400	NA	22,900	9,900	2,400	2,600	1,700
Men	64,800	71,100	64,600	NA	49,900	57,500	NA	21,200	7,100	2,300	1,800	1,600
Women	4,300	3,700	7,700	NA	2,100	5,000	NA	1,600	2,700	100	700	100
Engineers	1,212,600	1,240,700	1,268,400	NA	1,123,400	1,201,200	NA	117,300	67,200	16,000	27,200	16,700
Men	1,208,300	1,234,000	1,248,500	NA	1,117,600	1,183,400	NA	116,500	65,100	15,900	26,900	16,000
Women	4,300	6,700	19,800	NA	5,800	17,800	NA	900	2,100	100	300	700
Life scientists	238,600	277,500	291,000	NA	224,900	201,800	NA	52,600	89,100	4,800	8,800	4,900
Men	193,400	226,000	227,800	NA	176,400	165,600	NA	49,600	62,100	4,000	6,600	3,800
Women	45,200	51,400	63,200	NA	48,500	36,200	NA	2,900	26,900	800	2,200	1,200
Psychologists	89,600	97,800	120,900	NA	84,200	71,200	NA	13,500	49,700	4,400	8,000	2,300
Men	71,500	76,700	89,700	NA	64,600	58,200	NA	12,100	31,500	1,500	3,300	1,400
Women	18,100	21,100	31,200	NA	19,700	13,100	NA	1,400	18,200	2,900	4,700	900
Social scientists	187,900	198,300	186,000	NA	163,600	96,200	NA	34,700	89,800	4,500	13,10	2,500
Men	144,500	153,200	149,500	NA	124,900	89,000	NA	28,300	60,500	2,700	9,00	1,100
Women	43,400	45,200	36,400	NA	38,700	7,200	NA	6,400	29,300	800	4,20	1,400

NA: Not available.

NOTE: Detail may not add to total because of rounding.

SOURCE: National Science Foundation

Table 71. Scientists and engineers by field, sex, and type of employer: 1974, 1976 and 1978

Field	Total			Business & industry			Educational institutions			Federal Government			All other[1]		
	1974	1976	1978	1974	1976	1978	1974	1976	1978	1974	1976	1978	1974	1976	1978
Total, all fields	2,248,200	2,377,200	2,473,200	1,376,200	1,433,100	1,528,100	341,300	370,700	380,800	189,100	205,600	205,800	341,500	367,800	358,400
Men	2,072,100	2,179,900	2,241,700	1,313,800	1,362,600	1,445,300	288,200	312,100	304,800	175,500	189,700	187,300	294,500	315,600	304,600
Women	176,100	197,200	231,500	62,400	70,500	82,700	53,100	58,600	76,000	13,600	15,900	18,600	47,000	52,200	54,000
Physical scientists	201,400	227,400	212,400	98,000	108,700	116,300	47,400	54,100	55,500	19,600	22,800	18,000	36,400	41,700	22,600
Men	185,500	207,500	197,400	89,300	99,000	108,400	44,200	49,400	51,500	18,800	21,100	16,900	33,200	38,000	20,500
Women	15,900	19,900	15,000	8,700	9,700	7,900	3,200	4,700	4,000	800	1,800	1,100	3,200	3,900	2,100
Mathematical scientists	82,800	88,300	88,400	32,000	33,600	34,200	31,900	34,600	35,100	7,900	8,700	9,400	11,000	11,300	9,700
Men	69,300	72,700	70,900	27,000	27,900	25,600	28,100	29,800	28,600	6,100	6,600	8,800	8,100	8,400	7,800
Women	13,500	15,600	17,500	5,000	5,700	8,600	3,800	4,800	6,500	1,800	2,100	600	2,900	3,000	1,800
Computer specialists	166,200	172,300	233,900	121,600	125,900	173,000	13,400	13,800	17,900	13,900	14,300	14,600	17,300	18,200	28,800
Men	134,900	138,700	193,400	99,100	101,600	145,100	10,600	10,900	13,900	11,300	11,600	12,300	13,900	14,600	22,300
Women	31,300	33,600	40,600	22,500	24,300	27,300	2,800	2,900	4,000	2,600	2,800	2,300	3,400	3,800	6,600
Environmental scientists	69,100	74,800	72,300	36,200	40,400	40,400	10,100	11,100	12,900	10,600	11,100	10,400	12,100	12,200	8,600
Men	64,800	71,100	64,600	34,800	38,900	36,000	9,100	10,500	11,300	9,600	10,500	9,500	11,200	11,200	7,900
Women	4,300	3,700	7,700	1,400	1,500	4,400	1,000	600	1,600	1,000	600	900	900	900	700
Engineers	1,212,600	1,240,700	1,268,400	939,600	959,700	985,400	43,100	43,900	48,700	95,100	97,500	90,600	134,800	139,500	143,700
Men	1,208,300	1,234,000	1,248,500	936,700	955,100	969,100	42,900	43,600	47,700	94,700	96,900	89,200	134,000	138,400	142,500
Women	4,300	6,700	19,800	2,900	4,600	16,300	200	300	900	400	700	1,400	800	1,100	1,200
Life scientists	238,600	277,500	291,000	89,500	102,000	86,400	75,300	86,100	94,400	17,900	25,600	41,800	55,900	63,700	68,200
Men	193,400	226,000	227,800	78,000	88,300	77,300	56,300	65,500	65,500	16,000	23,100	35,500	43,100	49,000	49,600
Women	45,200	51,400	63,200	11,500	13,700	9,100	19,000	20,700	28,900	1,900	2,500	6,400	12,800	14,600	18,800
Psychologists	89,600	97,800	120,900	17,700	18,700	31,600	39,300	42,900	55,300	5,100	5,400	4,000	27,500	30,700	29,900
Men	71,500	76,700	89,700	14,100	14,800	28,500	33,700	36,100	36,000	4,500	4,700	3,100	19,200	21,200	22,100
Women	18,100	21,100	31,200	3,600	3,900	3,000	5,600	6,700	19,400	600	700	900	8,300	9,600	7,900
Social Scientists	187,900	198,300	186,000	41,600	44,100	60,800	80,800	84,300	61,300	19,000	20,000	17,000	46,500	49,900	46,700
Men	144,500	153,200	149,500	34,800	37,000	55,300	63,300	66,300	50,200	14,500	15,300	12,000	31,800	34,600	31,900
Women	43,400	45,200	36,500	6,800	7,100	5,600	17,500	17,900	11,100	4,500	4,700	5,000	14,700	15,400	14,900

[1] Includes nonprofit organizations; military; State, local, and other government; other and no report.

NOTE: Detail may not add to total because of rounding.

SOURCE: National Science Foundation

Table 72. Scientists and engineers by field, sex, and primary work activity: 1974, 1976, and 1978

	Total			Research and Development								
				Research			Development			Management of R&D		
Field	1974	1976	1978	1974	1976	1978	1974	1976	1978	1974	1976	1978
Total, all fields	2,248,200	2,377,200	2,473,200	210,400	231,700	278,000	380,500	396,400	407,300	191,300	202,600	228,200
Men	2,072,100	2,179,900	2,241,700	180,500	197,600	230,600	371,500	386,100	393,500	181,600	192,000	218,400
Women	176,100	197,200	231,500	29,800	34,100	47,300	9,000	10,100	13,800	9,700	10,500	9,800
Physical scientists	201,400	227,400	212,400	54,500	62,700	66,500	24,500	27,600	28,000	21,100	24,300	28,600
Men	185,500	207,500	197,400	48,900	55,400	59,700	22,900	25,900	26,400	20,800	23,700	28,000
Women	15,900	19,900	15,000	5,500	7,400	6,800	1,600	1,800	1,600	300	600	600
Mathematical scientists	82,800	88,300	86,400	4,800	5,500	12,700	6,200	6,700	[illegible],600	5,400	5,800	6,800
Men	69,300	72,700	70,900	4,400	5,000	10,400	6,000	6,300	3,600	4,300	4,500	6,500
Women	13,500	15,600	17,500	400	500	2,300	200	400	(2)	100	1,300	300
Computer specialists	166,200	172,300	233,900	2,300	2,300	5,700	20,900	21,300	28,200	6,500	6,700	14,300
Men	134,900	138,700	193,400	1,900	2,000	5,300	17,300	17,500	23,700	5,800	5,900	13,200
Women	31,300	33,600	46,600	400	400	600	3,800	3,700	4,400	700	700	1,100
Environmental scientists	69,100	74,800	72,300	14,900	15,900	20,600	2,700	2,800	5,500	3,100	3,600	4,500
Men	64,800	71,100	64,600	13,300	14,700	17,700	2,500	2,700	5,300	3,000	3,500	4,200
Women	4,300	3,700	7,700	1,500	1,300	2,800	200	100	200	1,100	100	300
Engineers	1,212,600	1,240,700	1,268,400	48,300	49,500	50,300	319,900	328,100	327,800	118,400	120,800	125,200
Men	1,208,300	1,234,000	1,248,500	47,900	48,800	48,300	318,200	325,900	323,700	118,100	120,500	123,800
Women	4,300	6,700	19,800	400	600	2,000	1,700	2,200	4,200	300	300	1,300
Life scientists	238,600	277,500	291,000	59,400	67,600	89,400	2,400	4,800	9,300	16,100	19,200	22,500
Men	193,400	226,000	227,800	43,400	49,500	63,900	2,000	4,200	6,800	12,600	15,500	19,300
Women	45,200	51,400	63,200	16,000	17,600	25,300	400	600	2,500	3,500	3,700	3,200
Psychologists	89,600	97,800	120,900	8,300	9,200	11,400	(2)	400	500	6,700	7,300	7,800
Men	71,500	76,700	89,700	6,300	6,800	8,200	(2)	300	300	6,000	6,400	6,200
Women	18,100	21,100	31,200	2,000	2,400	3,200	(2)	100	200	700	900	1,600
Social scientists	187,900	198,300	186,000	18,000	19,400	21,600	3,900	4,700	4,400	14,000	14,800	18,500
Men	144,400	153,200	149,500	14,400	15,400	17,200	2,600	3,400	3,700	11,000	11,800	17,200
Women	43,500	45,200	36,500	3,600	4,000	4,400	1,300	1,300	700	3,000	3,000	1,300

Table 72 - Con.

	Management			Teaching			Other[1]		
Field	1974	1976	1978	1974	1976	1978	1974	1976	1978
Total, all fields	353,500	370,800	394,800	223,700	237,100	225,200	888,900	938,700	940,000
Men	338,900	354,600	377,700	188,800	202,300	179,900	811,000	847,600	841,700
Women	14,600	16,300	17,100	34,800	34,800	45,200	78,000	91,300	98,300
Physical scientists	10,100	11,800	16,900	29,800	32,900	25,800	61,500	67,900	46,500
Men	9,700	11,300	16,300	27,900	31,000	24,400	55,300	60,200	42,600
Women	400	600	600	1,900	1,900	1,400	6,200	7,700	3,900
Mathematical scientists	6,000	6,600	8,600	25,000	28,200	29,300	35,400	35,500	27,600
Men	4,900	5,200	8,100	20,900	23,600	25,600	28,800	28,000	16,800
Women	1,100	1,300	500	4,100	4,700	3,700	6,600	7,500	10,800
Computer specialists	20,800	21,200	20,000	2,600	2,700	6,700	113,100	118,200	159,000
Men	17,800	18,100	18,500	2,200	2,300	5,600	89,900	92,900	127,100
Women	3,000	3,100	1,500	400	400	1,100	23,200	25,400	31,900
Environmental scientists	9,000	9,800	7,100	6,500	6,500	6,300	33,000	36,200	28,400
Men	8,900	9,700	7,100	6,000	6,100	5,900	31,000	34,400	24,400
Women	100	200	(2)	400	300	400	2,000	1,800	3,900
Engineers	244,200	249,000	247,400	31,300	31,800	25,100	450,500	461,600	492,700
Men	243,800	248,500	246,800	31,300	31,800	25,000	499,000	458,700	481,100
Women	400	500	600	(2)	(2)	100	1,400	2,800	11,600
Life scientists	23,200	29,900	47,300	42,700	46,600	56,100	94,800	110,000	66,500
Men	21,100	27,200	42,300	32,700	37,000	37,500	81,700	92,800	57,900
Women	2,100	2,100	5,100	10,000	9,700	18,500	13,100	17,200	8,500
Psychologists	6,700	7,400	12,600	22,400	23,500	29,100	45,500	50,000	59,400
Men	5,200	5,800	9,800	18,300	19,400	17,600	35,700	38,000	47,600
Women	1,500	1,600	2,800	4,100	4,100	11,500	9,800	12,000	11,800
Social scientists	33,500	35,200	34,900	62,700	64,900	46,900	55,800	59,300	60,000
Men	27,500	28,900	28,800	49,500	51,300	38,300	39,500	42,200	44,300
Women	6,000	6,300	6,100	13,200	13,600	8,600	16,300	17,000	15,400

[1] Includes consulting, production/inspection, reporting, statistical work, computing, other activities and no report

[2] Too few cases to estimate

NOTE: Detail may not add to total because of rounding.

SOURCE: National Science Foundation.

Table 73. Scientists and engineers by field, labor force status, and race: 1974, 1976, and 1978

Field	Total					Total labor force					Outside labor force				
	Total	White	Black	Asian	Other[1]	Total	White	Black	Asian	Other[1]	Total	White	Black	Asian	Other[1]
						1974									
Total, all fields	2,481,800	2,375,600	38,500	43,900	23,800	2,288,000	2,188,500	35,500	41,200	22,800	193,800	187,100	3,000	2,700	1,000
Physical scientists	247,900	235,400	4,100	6,200	2,100	206,500	195,000	4,100	6,000	1,400	41,400	40,400	(2)	200	800
Mathematical scientists	101,000	96,700	2,500	1,500	400	84,500	80,600	2,200	1,300	400	16,500	16,100	300	200	(2)
Computer specialists	170,000	162,500	3,300	3,500	700	167,100	160,000	3,000	3,400	700	2,900	2,500	300	100	(2)
Environmental scientists	79,000	77,300	200	700	700	71,500	70,000	200	700	600	7,500	7,300	(2)	(2)	100
Engineers	1,291,600	1,246,700	11,600	22,300	10,800	1,228,600	1,184,900	10,900	22,000	10,800	63,000	61,800	900	300	(2)
Life scientists	266,000	255,700	3,200	3,700	3,400	243,400	233,900	2,700	3,400	3,400	22,600	21,800	500	300	(2)
Psychologists	109,300	103,500	1,800	3,000	1,000	94,000	88,800	1,700	2,500	1,000	15,300	14,700	100	500	(2)
Social scientists	217,000	197,800	11,600	3,000	4,600	192,400	175,400	10,700	1,900	4,400	24,600	22,400	900	1,100	200
						1976									
Total, all fields	2,705,800	2,593,600	40,400	45,400	26,400	2,451,700	2,348,200	36,000	42,600	24,800	254,100	245,400	4,400	2,800	1,600
Physical scientists	280,600	266,300	4,400	5,900	4,000	237,200	224,800	3,400	5,600	3,600	43,300	41,500	1,000	300	500
Mathematical scientists	110,200	105,300	2,700	1,600	500	92,200	88,000	2,400	1,200	500	18,000	17,300	300	400	(2)
Computer specialists	179,900	171,800	3,700	3,700	800	173,500	165,400	3,700	3,600	800	6,400	6,400	(2)	(2)	(2)
Environmental scientists	85,700	84,600	100	500	500	77,400	76,300	100	500	500	8,300	8,300	(2)	(2)	(2)
Engineers	1,375,200	1,327,300	12,600	23,000	12,400	1,268,000	1,222,400	12,200	21,400	12,100	107,200	104,900	400	1,600	300
Life scientists	314,100	302,100	3,600	4,100	4,200	286,300	275,600	3,000	3,900	3,800	27,800	26,500	600	300	400
Psychologists	122,900	116,900	1,600	3,300	1,100	105,700	100,100	1,500	3,200	1,100	17,200	16,800	200	100	100
Social scientists	237,200	219,400	11,600	3,400	2,800	211,400	195,700	9,800	3,300	2,600	25,600	23,700	1,800	100	100
						1978									
Total, all fields	2,741,400	2,621,200	41,800	53,700	24,700	2,507,600	2,393,000	39,600	51,300	23,200	233,800	227,600	2,200	2,500	1,500
Physical scientists	254,600	243,300	3,700	5,700	1,900	216,700	206,800	3,200	5,300	1,400	37,900	36,500	500	400	500
Mathematical scientists	107,800	101,300	3,000	2,000	1,400	89,800	83,900	2,900	1,800	1,200	18,000	17,400	100	100	200
Computer specialists	237,500	229,100	1,400	6,900	100	234,600	226,300	1,300	6,900	100	2,900	2,800	100	100	(2)
Environmental scientists	80,8[illegible]	78,900	700	600	500	73,900	72,200	700	600	500	6,900	6,700	(2)	100	100
Engineers	1,396,400	1,344,000	11,400	27,000	13,900	1,285,000	1,234,400	10,600	26,400	13,600	111,300	109,600	800	700	300
Life scientists	327,600	313,100	6,700	5,900	1,900	295,800	282,400	6,600	5,200	1,600	31,800	30,700	100	700	200
Psychologists	131,700	127,000	3,700	100	800	123,200	119,000	3,500	(2)	700	8,500	8,000	300	200	(2)
Social scientists	205,100	184,600	11,000	5,400	4,000	188,500	168,700	10,700	5,100	4,000	16,600	15,900	300	300	100

[1] Includes American Indians, other, and no report

[2] Too few cases to estimate.

NOTE: Detail may not add to total because of rounding.

SOURCE: National Science Foundation

Table 74. Selected characteristics of employed doctoral scientists and engineers in the United States: 1973, 1975, 1977, and 1979

Characteristics	1973			1975			1977			1979		
	Number	Percent	Median annual salary	Number	Percent	Median annual salary	Number	Percent	Median annual salary	Number	Percent	Median annual salary
Total	220,410	100.00	$20,700	256,048	100.00	$23,200	284,237	100.0	$25,600	313,736	100.0	$29,100
Field:												
Physical scientists	48,466	22.0	21,000	54,638	21.3	23,900	57,450	20.2	26,600	60,170	19.2	30,300
Chemists	30,704	13.9	21,000	35,812	14.0	24,000	37,314	13.1	26,600	39,569	12.6	30,400
Physicists/astronomers	17,762	8.1	21,000	18,826	7.4	23,700	20,136	7.1	26,500	20,801	6.6	30,100
Mathematical scientists	12,145	5.5	19,200	13,639	5.3	21,200	14,573	5.1	23,300	15,297	4.9	26,300
Mathematicians	10,686	4.8	19,000	11,898	4.6	20,900	12,860	4.5	23,100	12,930	4.1	26,100
Statisticians	1,459	.7	20,900	1,741	.7	23,100	1,713	.6	25,100	2,367	.8	29,300
Computer specialists	2,692	1.2	21,700	3,496	1.4	23,500	5,767	2.0	25,800	6,139	2.1	28,500
Environmental scientists	10,329	4.7	20,700	12,126	4.7	23,500	13,026	4.6	25,800	14,609	4.7	30,300
Earth scientists	8,534	3.9	20,700	9,531	3.7	23,600	9,765	3.4	25,900	11,144	3.6	30,300
Oceanographers	1,157	.5	19,800	1,277	.5	22,200	1,563	.5	24,100	1,662	.6	28,800
Atmospheric scientists	638	.3	22,500	1,318	.5	24,200	1,698	.6	28,300	1,803	.6	31,300
Engineers	35,775	16.2	22,300	42,410	16.6	25,200	45,046	15.8	28,600	50,222	16.0	33,100
Life scientists	58,047	26.3	20,100	65,184	25.5	22,300	71,924	25.3	24,700	80,090	25.5	28,100
Biological scientists	36,859	16.7	19,400	39,076	15.3	21,300	42,161	14.8	23,800	45,746	14.6	26,500
Agricultural scientists	10,553	4.8	19,900	12,924	5.0	22,100	14,293	5.0	24,800	15,061	4.8	29,000
Medical scientists	10,635	4.8	22,700	13,184	5.1	25,700	15,470	5.4	28,000	19,283	6.1	30,900
Psychologists	24,850	11.3	20,200	30,073	11.7	22,100	33,724	11.9	24,100	37,987	12.1	26,700
Social scientists	28,106	12.8	20,300	34,482	13.5	22,100	42,727	15.0	24,100	48,622	15.5	26,200
Economists	8,289	3.8	22,300	9,888	3.9	24,500	10,790	3.8	27,000	11,718	3.7	31,000
Sociologists/anthropologists	6,530	3.0	19,300	7,930	3.1	20,700	9,493	3.3	22,200	10,224	3.3	23,900
Other social scientists	13,287	6.0	19,500	16,664	6.5	21,100	22,444	7.9	23,200	26,680	8.5	25,300
Sex:												
Men	203,452	92.3	21,000	233,935	91.4	23,500	256,735	90.3	26,000	280,393	89.4	29,900
Women	16,958	7.7	17,400	22,113	8.6	19,000	27,502	9.7	20,700	33,343	10.6	23,100
Race:												
White	200,691	91.1	21,000	229,322	89.6	23,200	253,309	89.1	25,700	276,872	88.2	29,200
Black	2,034	.9	21,200	2,474	1.0	22,800	2,744	1.0	23,800	3,420	1.1	26,600
Am. Indian	340	.2	(1)	435	.2	20,800	597	.2	23,900	926	.3	25,800
Asian	8,989	4.1	20,000	12,577	4.9	21,500	15,242	5.4	23,800	21,031	6.7	28,200
No report	8,356	3.8	20,800	11,240	4.4	23,100	12,345	4.3	25,700	11,487	3.7	29,800
Age:												
Under 30	9,669	4.4	15,400	9,528	3.7	16,900	8,474	3.0	18,500	7,476	2.4	21,300
30-34	49,726	22.6	17,300	55,217	21.6	18,800	53,562	18.8	20,400	52,703	16.8	22,800
35-39	42,064	19.1	19,600	53,516	20.9	21,500	66,741	23.5	23,600	75,887	24.2	26,600
40-44	35,304	16.0	21,600	40,044	15.6	24,200	45,147	15.9	26,500	54,296	17.3	30,200
45-49	29,945	13.6	24,100	33,640	13.1	26,200	37,626	13.2	29,200	39,860	12.7	32,000
50-54	24,109	10.9	24,900	28,675	11.2	28,100	30,935	10.9	30,900	33,104	10.6	34,100
55-59	15,579	7.1	25,200	18,435	7.2	28,200	22,507	7.9	31,600	26,501	8.4	36,100
60-64	8,982	4.1	25,500	11,255	4.4	28,500	12,944	4.6	31,400	15,438	4.9	36,000
65 & over	4,876	2.2	24,700	5,476	2.1	(1)	5,974	2.1	31,200	7,951	2.5	35,700
No report	156	.1	24,300	262	.1	24,200	327	.1	26,600	520	.2	23,100
Sector of employment:												
Business & industry	53,403	24.2	23,300	64,630	25.2	26,000	71,464	25.1	29,900	82,824	26.4	33,800
Educational institutions	129,408	58.7	19,100	149,184	58.3	21,400	163,101	57.4	23,700	173,966	55.4	26,400
4-year coll./univ.	124,901	56.7	19,200	143,701	56.1	21,500	156,452	55.0	23,800	166,985	53.2	26,400
2-year college	2,962	1.3	17,800	3,567	1.4	19,100	4,634	1.6	20,900	4,512	1.4	24,600
Elem./sec. school	1,545	.7	19,300	1,916	.7	20,500	2,015	.7	22,400	2,496	.8	25,800
Hospital/clinic	4,543	2.1	19,400	7,469	2.9	21,800	8,587	3.0	23,600	9,706	3.1	26,200
Nonprofit organizations	8,006	3.6	21,700	8,337	3.3	24,400	10,188	3.6	26,800	12,549	4.0	26,200
Federal Government	18,200	8.3	23,500	18,995	7.4	26,300	21,353	7.5	29,700	23,923	7.6	30,300
Military/Commissioned Corps	1,977	.9	(2)	2,130	.8	(2)	2,282	.8	(2)	2,304	.7	33,400
State government	3,001	1.4	19,500	3,015	1.2	20,900	3,783	1.3	21,600	4,175	1.3	(1)
Other government	1,255	.6	19,000	1,880	.7	22,900	1,545	.5	22,100	1,943	.6	23,500
Other	331	.2	21,100	82	(3)	(1)	584	.2	37,500	945	.3	23,000
No report	286	.1	(1)	326	.1	(1)	1,350	.5	(1)	1,401	.4	42,700
Primary work activity:												
Research and development	97,683	44.3	21,700	111,029	43.4	24,600	124,193	43.7	27,300	142,743	45.5	30,900
Basic research	34,258	15.5	19,900	38,144	14.9	22,200	43,545	15.3	24,600	47,864	15.3	27,700
Applied research	28,700	13.0	21,000	32,885	12.8	23,300	36,413	12.8	26,300	36,842	11.7	30,000
Development	8,502	3.9	21,100	11,331	4.4	23,600	13,502	4.8	26,100	14,995	4.8	30,800
R&D Management[4]	26,223	11.9	27,000	28,669	11.2	30,100	30,733	10.8	33,100	43,042	13.7	35,900
Management or administration	19,949	9.1	25,700	23,109	9.0	28,800	29,731	10.5	30,800	29,182	9.3	32,400
Teaching	80,012	36.3	18,900	91,159	35.6	20,600	90,392	31.8	22,600	91,922	29.3	25,200
Consulting	4,055	1.8	23,200	5,516	2.2	25,400	6,141	2.2	28,200	8,998	2.9	31,300
Sales/professional services	8,084	3.7	20,700	11,672	4.6	21,900	15,183	5.3	24,700	21,049	6.7	29,000
Other	6,959	3.2	(2)	7,485	2.9	22,100	12,785	4.5	24,900	15,679	5.0	24,900
No report	3,688	1.7	21,400	6,078	2.4	23,700	5,812	2.0	25,400	4,163	1.3	29,900

[1] No median computed for groups with fewer than 20 individuals reporting salary.
[2] Data not available.
[3] Less than .05 percent.
[4] The classification of management or administration was changed in 1979, and may have resulted in a disproportionately large number of individuals reporting themselves in R&D management in preference to other options.

NOTE: Percents may not add to 100 because of rounding. Median salaries computed for full-time employed civilians only.

SOURCE: National Science Foundation.

Table 75. Employed doctoral scientists and engineers by field and type of employer: 1973, 1975, 1977, and 1979

Field	Educational institutions				Business and industry				Federal Government			
	1973	1975	1977	1979	1973	1975	1977	1979	1973	1975	1977	1979
Total, all fields	129,400	149,200	163,100	174,000	53,400	64,600	71,500	82,800	18,200	19,000	21,400	23,900
Physical scientists	22,000	25,700	27,100	27,200	19,700	22,100	23,000	25,000	4,100	3,700	3,900	4,600
Mathematical scientists	10,500	11,700	12,200	12,600	900	1,100	1,300	1,400	500	600	600	800
Computer specialists	1,400	1,700	2,100	2,500	1,000	1,400	3,100	3,700	100	200	300	300
Environmental scientists	5,200	6,000	6,300	6,200	2,200	2,900	3,100	4,200	2,000	2,200	2,400	2,700
Engineers	13,000	14,900	15,900	17,000	17,800	22,100	22,900	4,200	2,700	3,000	3,500	3,600
Life scientists	39,200	43,800	47,500	52,300	7,200	8,800	10,100	11,500	6,100	6,300	6,800	7,500
Psychologists	15,100	17,700	18,600	19,900	3,100	4,100	5,500	7,100	1,200	1,000	1,200	1,100
Social scientists	23,300	27,700	33,400	36,300	1,600	2,100	2,600	3,500	1,500	2,000	2,600	3,300
	Percent distribution											
Total, all fields	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Physical scientists	17.0	17.2	16.6	15.6	36.8	34.2	32.2	30.2	22.5	19.7	18.5	19.2
Mathematical scientists	8.1	7.9	7.5	7.2	1.6	1.6	1.8	1.7	2.7	2.9	2.8	3.3
Computer specialists	1.1	1.1	1.3	1.4	1.9	2.2	4.3	4.5	.7	1.0	1.2	1.3
Environmental scientists	4.0	4.0	3.9	3.6	4.1	4.5	4.3	5.1	10.8	11.6	11.5	11.3
Engineers	10.1	10.0	9.8	9.8	33.3	34.2	32.0	31.9	15.0	15.9	16.5	15.1
Life scientists	30.3	29.4	29.1	30.1	13.6	13.7	14.1	13.9	33.6	33.1	31.7	31.4
Psychologists	11.7	11.9	11.4	11.4	5.8	6.4	7.7	8.6	6.8	5.1	5.8	4.6
Social scientists	17.8	18.6	20.5	20.9	3.0	3.2	3.6	4.2	8.0	10.6	12.4	13.8

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 76. Doctoral scientists and engineers by primary work activity and type of employer: 1973, 1975, 1977, and 1979

Primary work activity	Educational institutions				Business and industry				Federal Government			
	1973	1975	1977	1979	1973	1975	1977	1979	1973	1975	1977	1979
Total	129,400	149,200	163,100	174,000	53,400	64,600	71,500	82,800	18,200	19,000	21,400	23,900
Research and development	35,200	40,700	48,700	55,100	38,000	44,400	47,200	54,600	14,500	15,100	16,200	18,800
Basic research	22,500	25,300	30,000	33,200	3,500	4,300	4,600	4,700	4,700	4,700	4,700	5,400
Applied research	7,600	9,600	11,100	12,500	13,200	15,100	16,500	14,300	4,800	5,000	5,200	5,700
Development	600	700	1,500	1,100	7,000	9,400	10,200	11,800	500	700	900	1,100
Management of R&D	4,500	5,100	6,100	8,300	14,200	5,700	15,900	23,800	4,500	4,700	5,400	6,700
Management/administration	9,100	10,300	13,900	18,200	5,600	6,900	8,000	4,100	1,700	1,400	2,200	1,700
Other than R&D	6,200	6,800	10,100		3,500	4,700	6,100		1,000	900	1,500	
Of both[1]	2,900	3,500	3,800		2,100	2,200	1,900		700	500	700	
Teaching	78,600	90,300	89,300	90,900	200	200	200	200	100	200		
Other[2]	6,100	7,800	11,200	9,800	9,600	13,000	15,900	23,900	1,700	2,300	2,700	3,200
	Percent Distribution											
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Research and development	27.2	27.2	29.9	31.7	71.2	68.7	66.0	65.9	79.7	79.5	75.7	78.7
Basic research	17.4	17.0	18.4	19.1	6.6	6.6	6.5	5.7	26.0	24.6	22.1	22.6
Applied research	5.9	6.4	6.8	7.2	24.7	23.4	23.1	17.3	26.4	26.6	24.4	23.8
Development	.5	.5	.9	6.3	13.1	14.5	14.2	14.3	2.6	3.5	4.3	4.6
Management of R&D	3.5	3.4	3.8	4.8	26.7	24.3	22.3	28.7	24.7	24.8	25.3	28.0
Management/administration	7.0	6.9	8.5	10.5	10.5	10.8	11.2	5.0	9.3	9.4	10.6	7.1
Other than R&D	4.8	4.6	6.2		6.5	7.3	8.6		5.7	4.6	7.2	
Of both	2.2	2.3	2.3		4.0	3.5	2.6		3.6	2.8	3.4	
Teaching	61.0	60.6	54.7	52.2	.4	.3	.3	2.4	1.4	.7	.7	8.4
Other	4.7	5.3	6.8	5.6	18.0	20.2	22.3	28.9	9.6	12.3	12.6	13.4

[1] The classification of Management or Administration was changed in 1979, and may have resulted in a disproportionately large number of individuals reporting themselves in R&D mangement in preference to other options.
[2] Includes consulting, sales/professional services, other, and no report.
NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 77. Selected characteristics of employed women doctoral scientists and engineers in the United States: 1973, 1975, 1977, and 1979

Characteristics	1973				1975				1977				1979			
	Number	Percent	Percent of total employed	Median annual salary	Number	Percent	Percent of total employed	Median annual salary	Number	Percent	Percent of total employed	Median annual salary	Number	Percent	Percent of total employed	Median annual salary
Total	16,958	100.0	7.7	$17,400	22,113	100.0	8.6	$19,000	27,502	100.0	9.7	$20,700	33,343	100.0	10.6	$23,100
Field:																
Physical scientists	1,897	11.2	3.9	17,400	2,521	11.4	4.6	19,100	2,908	10.6	5.1	21,200	3,123	9.4	5.2	24,400
Chemists	1,461	8.6	4.8	17,300	2,046	9.3	5.7	19,000	2,354	8.6	6.3	20,900	2,546	7.6	6.4	24,200
Physicists/astronomers	436	2.6	2.5	17,700	475	2.1	2.5	19,300	554	2.0	2.8	23,100	577	1.7	2.8	25,400
Mathematical scientists	775	4.6	6.4	17,100	907	4.1	6.7	18,300	1,048	3.8	7.2	19,900	1,138	3.4	7.4	21,700
Mathematicians	701	4.1	6.6	16,800	822	3.7	6.9	18,100	934	3.4	7.3	19,900	977	2.9	7.6	21,800
Statisticians	74	.4	5.1	19,500	85	.4	4.9	22,100	114	.4	6.7	19,800	161	.5	6.8	21,600
Computer specialists	88	.5	3.3	17,700	147	.7	4.2	18,000	233	.8	4.0	20,800	366	1.1	5.4	22,800
Environmental scientists	262	1.5	2.5	17,000	325	1.5	2.7	19,000	439	1.6	3.4	19,700	607	1.8	4.2	23,500
Earth scientists	205	1.2	2.4	16,700	242	1.1	2.5	18,200	293	1.1	3.0	20,000	410	1.2	3.7	25,300
Oceanographers	37	.2	3.2	(1)	51	.2	4.0	(1)	75	.3	4.8	19,200	152	.5	9.1	21,500
Atmospheric scientists	20	.1	3.1	(1)	32	.1	2.4	(1)	71	.3	4.2	19,200	45	.1	2.5	(1)
Engineers	139	.8	.4	19,600	235	1.1	.6	20,800	283	1.0	.6	22,900	527	1.6	1.0	26,600
Life scientists	6,120	36.1	10.5	17,300	7,534	34.1	11.6	18,900	8,983	32.7	12.5	21,000	11,142	33.4	13.9	23,000
Biological scientists	4,896	28.9	13.3	17,100	5,797	26.2	14.8	18,400	6,684	24.3	15.9	20,500	7,882	23.6	17.2	22,200
Agricultural scientists	131	.8	1.2	(1)	167	.8	1.3	20,000	264	1.0	1.8	20,200	320	1.0	2.1	21,600
Medical scientists	1,093	6.4	10.3	18,300	1,570	7.1	11.9	20,600	2,035	7.4	13.2	22,800	2,940	8.8	15.2	25,300
Psychologists	4,782	28.2	19.2	18,200	6,349	28.7	21.1	19,600	7,645	27.8	22.7	20,600	9,216	27.6	24.3	23,200
Social scientists	2,895	17.1	10.3	17,600	4,095	18.5	11.9	18,700	5,963	21.7	14.0	20,200	7,224	21.7	14.9	22,600
Economists	476	2.8	5.7	19,300	614	2.8	6.2	21,400	788	2.9	7.3	23,600	977	2.9	8.3	26,900
Sociologists/anthropologists	1,227	7.2	18.8	17,100	1,675	7.6	21.1	18,500	2,286	8.3	24.1	19,700	2,558	7.7	25.0	22,100
Other social scientists	1,192	7.0	9.0	17,400	1,806	8.2	10.8	18,200	2,889	10.5	12.9	19,800	3,689	11.1	13.8	22,300
Age:																
Under 30	1,026	6.1	10.6	14,400	1,534	6.9	16.1	15,900	1,640	6.0	19.4	17,400	1,464	4.4	19.6	18,700
30-34	3,546	20.9	7.1	14,900	4,970	22.5	9.0	16,800	6,621	24.1	12.4	18,400	8,450	25.3	16.0	20,600
35-39	2,767	16.3	6.6	16,600	4,082	18.5	7.6	18,300	5,641	20.5	8.5	20,000	7,440	22.3	9.8	22,400
40-44	2,445	14.4	6.9	17,900	2,810	12.7	7.0	19,900	3,479	12.6	7.7	21,700	4,740	14.2	8.7	24,600
45-49	2,488	14.7	8.3	18,700	2,917	13.2	8.7	21,300	3,291	12.0	8.7	23,100	3,345	10.0	8.4	25,500
50-54	1,845	10.9	7.7	19,500	2,407	10.9	8.4	22,300	2,887	10.5	9.3	24,700	3,147	9.4	9.5	26,700
55-59	1,379	8.1	8.9	20,200	1,467	6.6	8.0	21,600	1,876	6.8	8.3	24,200	2,307	6.9	8.7	28,700
60-64	847	5.0	9.4	20,500	1,160	5.2	10.3	22,700	1,233	4.5	9.5	25,000	1,392	4.2	9.0	29,200
65 & over	570	3.4	11.7	19,800	703	3.2	12.8	22,400	726	2.6	12.2	25,100	913	2.7	11.5	29,700
No report	45	.3	28.8	(1)	63	.3	24.0	(1)	108	.4	33.0	(1)	145	.4	27.9	(1)
Sector of employment:																
Business & industry	1,363	8.0	2.6	19,700	2,141	9.7	3.3	22,200	2,959	10.8	4.1	24,400	4,578	13.7	5.5	27,600
Educational institutions	12,160	71.7	9.4	17,100	15,536	70.3	10.4	18,400	18,773	68.3	11.5	20,000	21,894	65.7	12.6	22,300
4-year coll./univ.	11,128	65.6	8.9	17,100	14,236	64.4	9.9	18,400	17,144	62.3	11.0	20,000	20,073	60.2	12.0	22,200
2-year college	549	3.2	18.5	17,000	701	3.2	19.7	18,700	927	3.4	20.0	19,700	898	2.7	19.9	23,800
Elem./sec. school	483	2.8	31.3	19,900	599	2.7	31.3	20,700	702	2.6	34.8	21,000	923	2.8	37.0	24,300
Hospital/clinic	967	5.7	21.3	17,500	1,745	7.9	23.4	19,400	1,958	7.1	22.8	21,000	1,928	5.8	19.9	22,800
Nonprofit organization	783	4.6	9.8	17,900	917	4.1	11.0	19,600	1,445	5.3	14.2	21,100	1,857	5.6	14.8	23,200
Federal Government	971	5.7	5.3	22,100	1,033	4.7	5.4	24,700	1,273	4.6	6.0	26,600	1,621	4.9	6.8	28,000
Military/Comm. Corps	19	.1	1.0	(1)	39	.2	1.8	(1)	47	.2	2.1	(1)	52	.2	2.3	(1)
State government	386	2.3	12.9	19,000	393	1.8	13.0	19,700	495	1.8	13.1	19,500	772	2.3	18.5	20,400
Other government	188	1.1	15.0	17,300	235	1.1	12.5	19,900	345	1.3	22.3	21,700	397	1.2	20.4	24,200
Other	74	.4	22.4	19,700	15	.1	18.3	(1)	23	.1	3.9	(1)	51	.2	5.4	(1)
No report	47	.3	16.4	18,500	59	.3	18.1	(1)	184	.7	13.6	(1)	193	.6	13.8	(1)
Primary work activity:																
Research and development	5,358	31.6	5.5	17,900	6,891	31.2	6.2	19,800	8,828	32.1	7.1	21,700	11,408	34.2	8.0	24,100
Basic research	3,500	20.6	10.2	16,800	4,450	20.1	11.7	18,400	5,434	19.8	12.5	20,600	6,404	19.2	13.4	22,200
Applied research	1,004	5.9	3.5	19,100	1,323	6.0	4.0	20,400	1,755	6.4	4.8	22,200	2,427	7.3	6.6	25,000
Development	150	.9	1.8	17,200	225	1.0	2.0	19,500	405	1.5	3.0	20,500	542	1.6	3.6	24,300
R&D management[3]	704	4.2	2.7	23,200	843	4.0	3.1	24,300	1,234	4.5	4.0	26,300	2,035	6.1	4.7	27,800
Management or administration	1,133	6.7	5.7	20,600	1,548	7.0	6.7	22,400	2,204	8.0	7.4	25,100	3,056	9.2	10.5	25,400
Teaching	7,504	44.3	9.4	17,000	9,480	42.9	10.4	18,200	10,396	37.8	11.5	19,500	11,415	34.2	12.4	21,800
Consulting	333	2.0	8.2	18,300	400	1.8	7.3	20,500	495	1.8	8.1	22,300	606	1.8	6.7	25,100
Sales/professional services	1,647	9.7	20.4	18,200	2,348	10.6	20.1	20,000	3,222	11.7	21.2	21,200	4,378	13.1	20.8	24,500
Other	641	3.8	9.2	(2)	822	3.7	11.0	(2)	1,652	6.0	12.9	(2)	1,788	5.4	11.4	22,600
No report	342	2.0	9.3	17,600	624	2.8	10.3	20,700	705	2.6	12.1	20,300	692	2.1	16.6	23,200

[1] No median computed for groups with fewer than 20 individuals reporting salary.

[2] Data not available.

[3] The classification of management or administration was changed in 1979, and may have resulted in a disproportionately large number of individuals reporting themselves in R&D management in preference to other options.

NOTE: Percents may not add to 100 because of rounding. Median salaries computed for full-time employed civilians only.

SOURCE: National Science Foundation.

Table 78. Doctoral scientists and engineers by field and race: 1979

Field	White	Black	Asian
Total, all fields	293,500	3,700	21,700
Physical scientists	56,900	600	4,500
Mathematical scientists	13,900	200	1,000
Computer specialists	6,000	10	20
Environmental scientists	14,000	60	500
Engineers	42,100	200	7,700
Life scientists	77,000	1,000	5,100
Psychologists	37,200	600	400
Social scientists	46,400	1,100	2,100

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 79. Doctoral scientists and engineers by type of employer, primary work activity and race: 1979

Employer and work activity	White	Black	Asian
Type of employer:			
Total	276,900	3,400	21,000
Business and industry	70,800	400	8,800
Educational institutions	154,600	2,200	9,900
Federal Government	21,800	400	1,000
Other[1]	29,700	400	1,300
Primary work activity:			
Total	276,900	3,400	21,000
Research and development[2]	123,300	1,200	13,300
Teaching	82,100	1,200	4,800
Other[3]	71,500	1,000	2,900

[1] Includes hospitals/clinics, nonprofit organizations, military, State and other government, other and no report.

[2] Includes management of research and development.

[3] Includes management of non-research and development, consulting, sales/professional services, other, not employed and no report.

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 80. Projected changes in doctoral scientists and engineers: 1977-87

[Percents]

Field	National Science Foundation	Bureau of Labor Statistics
Total	47.1	49.4
Physical scientists	35.7	27.5
Mathematical scientists	40.0	35.7
Engineers	63.6	33.8
Life scientists	45.1	55.5
Social scientists	52.7	79.0

SOURCE: National Science Foundation

Table 82. Percent of science/engineering doctorates in non-science/engineering:[1] projections

Field	National Science Foundation	Bureau of Labor Statistics
Total	17	14
Physical scientists	9	10
Mathematical scientists	21	30
Engineers	19	−9[2]
Life scientists	16	20
Social scientists	19	27

[1] For NSF, data show estimated non-S/E utilization as percent of labor force for 1987. For BLS, data pertain to estimates of Ph.D.'s in traditional jobs as percent of total Ph.D. employment in 1985.

[2] That is, the supply of engineering Ph.D.'s is projected to fall short of requirements.

SOURCE: National Science Foundation

Table 81. Projected full-time labor force of doctoral scientists and engineers: 1982 and 1987

[In thousands]

Derivation of 1982 and 1987 labor force	Total	Physical sciences	Engineering	Mathematical sciences	Life sciences	Social sciences
	1982					
Employed full time in 1977	277	69	44	20	70	73
Full-time entrants, 1977–82	110	19	19	7	29	35
Graduates[1]	114	20	20	7	30	37
Part time or not seeking employment	−4	−1	—	—	−1	−2
Net migration	−6	—	−2	—	−2	−2
Immigration	10	3	3	1	2	2
Emigration	−16	−3	−5	−1	−4	−4
Attrition	−29	−5	−3	−2	−9	−9
1982 full-time labor force	352	83	58	25	88	97
	1987					
Full-time entrants, 1983–87	102	18	20	6	28	30
Graduates[1]	106	19	21	6	29	32
Part time or not seeking employment	−4	−1	—	—	−1	−2
Net migration	−5	—	−2	—	−2	−2
Immigration	8	3	2	1	1	1
Emigration	−13	−3	−4	−1	−3	−3
Attrition	−36	−6	−4	−3	−11	−12
1987 full-time labor force	412	95	72	28	103	113

[1] Corrected for field-switching.

NOTE: Detail may not add to totals because of rounding.
SOURCE: National Science Foundation

Table 83. Median annual salary of full-time employed doctoral scientists and engineers reporting research and development[1] as their primary work activity: 1973, 1975, 1977, and 1979

	1973	1975	1977	1979
Both sexes	$21,700	$24,600	$27,300	$30,900
Men	21,900	24,800	27,800	31,400
Women	17,900	19,800	21,700	24,100

[1] R&D includes administration of R&D, basic research, applied research, development of systems, and design.

NOTE: Median salaries computed for full-time employed civilians only.
SOURCE: Survey of Doctorate Recipients, CHR, National Research Council

Table 84. Bachelor's and first-professional degrees awarded by field: 1960-79

Year	All fields	Science and engineering fields						All other fields[4]
		Total	Physical sciences[1]	Engineering	Mathematical sciences[2]	Life sciences	Social sciences[3]	
	Number							
1960	394,889	120,937	16,057	37,808	11,437	24,141	31,494	273,952
1961	401,784	121,660	15,500	35,866	13,127	23,900	33,267	280,124
1962	420,485	127,469	15,894	34,735	14,610	25,200	37,030	293,016
1963	450,592	135,964	16,276	33,458	16,128	27,801	42,308	314,628
1964	502,104	153,361	17,527	35,226	18,677	31,611	50,320	348,743
1965	538,930	164,936	17,916	36,795	19,668	34,842	55,715	373,994
1966	555,613	173,471	17,186	35,815	20,182	36,964	63,424	382,142
1967	594,862	187,849	17,794	36,188	21,530	39,408	72,929	407,013
1968	671,591	212,174	19,442	37,614	24,084	43,260	87,774	459,417
1969	769,683	244,519	21,591	41,553	28,263	48,713	104,399	525,164
1970	833,322	264,122	21,551	44,772	29,109	52,129	116,561	569,200
1971	884,386	271,176	21,549	45,387	27,306	51,461	125,473	613,210
1972	937,884	281,228	20,887	46,003	27,250	51,484	133,604	656,656
1973	980,707	295,391	20,809	46,989	27,528	59,486	140,579	685,316
1974	1,008,654	305,062	21,287	43,530	26,570	68,226	145,449	703,592
1975	987,922	294,920	20,896	40,065	23,385	72,710	137,864	693,002
1976	997,504	292,174	21,559	39,114	21,749	77,301	132,451	705,330
1977	993,008	288,543	22,618	41,581	20,729	78,472	125,143	704,465
1978	997,165	288,167	23,175	47,411	19,925	77,138	120,518	708,998
1979	1,000,562	288,625	23,363	53,720	20,670	75,085	115,787	711,937
	As a percent of fields							
1960	100	31	4	10	3	6	8	69
1961	100	30	4	9	3	6	8	70
1962	100	30	4	8	4	6	9	70
1963	100	30	4	7	4	6	9	70
1964	100	31	4	7	4	6	10	69
1965	100	31	3	7	4	7	10	69
1966	100	31	3	6	4	7	11	69
1967	100	32	3	6	4	7	12	68
1968	100	32	3	6	4	6	13	68
1969	100	32	3	5	4	6	14	68
1970	100	32	3	5	4	6	14	68
1971	100	31	2	5	3	6	14	69
1972	100	30	2	5	3	6	14	70
1973	100	30	2	5	3	6	14	70
1974	100	30	2	4	3	7	14	70
1975	100	30	2	4	2	7	14	70
1976	100	29	2	4	2	8	13	71
1977	100	29	2	4	2	8	13	71
1978	100	29	2	5	2	8	12	71
1979	100	29	2	5	2	8	12	71

[1] Including environmental sciences.

[2] Including statistics and computer specialities.

[3] Excluding history and including psychology.

[4] Including first-professional degrees such as M.D., D.D.S., D.V.M., and J.D. degrees.

NOTE: Percents may not add to 100 because of rounding.

SOURCES: National Center for Education Statistics and National Science Foundation, unpublished data

Table 85. Master's degrees awarded by field: 1960-79

Year	All fields	Science and engineering fields						All other fields
		Total	Physical sciences[1]	Engineering	Mathematical sciences[2]	Life sciences	Social sciences[3]	
	Number							
1960	74,497	20,012	3,387	7,159	1,765	3,751	3,950	54,485
1961	78,269	22,786	3,799	8,178	2,238	4,085	4,486	55,483
1962	84,889	25,146	3,929	8,909	2,680	4,672	4,956	59,743
1963	91,418	27,367	4,132	9,635	3,323	4,718	5,559	64,051
1964	101,122	30,271	4,567	10,827	3,603	5,357	5,917	70,851
1965	112,195	33,835	4,918	12,056	4,294	5,978	6,589	78,360
1966	140,772	38,083	4,992	13,678	5,610	6,666	7,737	102,689
1967	157,892	41,800	5,412	13,885	5,733	7,465	9,305	116,092
1968	177,150	45,425	5,508	15,188	6,081	8,315	10,333	131,725
1969	194,414	48,425	5,911	15,243	6,735	8,809	11,727	145,989
1970	209,387	49,318	5,948	15,597	7,107	8,590	12,076	160,069
1971	231,486	50,624	6,386	16,347	6,789	8,320	12,782	180,862
1972	252,774	53,567	6,307	16,802	7,186	8,914	14,358	199,207
1973	264,525	54,234	6,274	16,758	7,146	9,080	14,976	210,291
1974	278,259	54,175	6,087	15,393	7,116	9,605	15,974	224,084
1975	293,651	53,852	5,830	15,434	6,637	9,618	16,333	239,799
1976	313,001	54,747	5,485	16,170	6,466	9,823	16,803	258,254
1977	318,241	56,731	5,345	16,889	6,496	10,707	17,294	261,510
1978	312,816	56,237	5,576	17,105	6,421	10,711	16,514	256,579
1979	302,075	54,456	5,464	16,193	6,101	10,719	15,979	247,619
	As a percent of all fields							
1960	100	27	5	10	2	5	5	73
1961	100	29	5	10	3	5	6	71
1962	100	30	5	11	3	6	6	70
1963	100	30	5	11	4	5	6	70
1964	100	30	5	11	4	5	6	70
1965	100	30	4	11	4	5	6	70
1966	100	27	4	10	4	5	6	73
1967	100	26	3	9	4	5	6	74
1968	100	26	3	9	3	5	6	74
1969	100	25	3	8	4	5	6	75
1970	100	24	3	7	3	4	6	76
1971	100	22	3	7	3	4	6	78
1972	100	21	3	7	3	4	6	79
1973	100	21	2	6	3	3	6	79
1974	100	19	2	6	3	3	6	81
1975	100	18	2	5	2	3	6	82
1976	100	17	2	5	2	3	5	83
1977	100	18	2	5	2	3	5	82
1978	100	18	2	5	2	3	5	82
1979	100	18	2	5	2	4	5	82

[1] Including environmental sciences.

[2] Including statistics and computer specialities.

[3] Excluding history and including psychology.

NOTE: Percents may not add to 100 because of rounding.

SOURCES: National Center for Education Statistics and National Science Foundation, unpublished data

Table 86. Doctoral degrees awarded by field: 1965-79

Year	All fields	Science and engineering fields						All other fields[4]
		Total	Physical sciences[1]	Engineering	Mathematical sciences[2]	Life sciences	Social sciences[3]	
	Number							
1965	16,340	10,477	2,865	2,073	685	2,539	2,315	5,863
1966	17,953	11,456	3,058	2,299	769	2,712	2,618	6,497
1967	20,384	12,982	3,502	2,603	830	2,967	3,080	7,402
1968	22,916	14,411	3,667	2,847	970	3,501	3,426	8,505
1969	25,724	15,949	3,910	3,249	1,064	3,796	3,930	9,775
1970	29,475	17,731	4,400	3,432	1,222	4,163	4,514	11,744
1971	31,772	18,880	4,494	3,495	1,236	4,533	5,122	12,892
1972	33,001	18,940	4,226	3,475	1,281	4,505	5,453	14,061
1973	33,727	18,948	4,016	3,338	1,222	4,574	5,798	14,779
1974	33,000	18,316	3,696	3,144	1,196	4,407	5,873	14,684
1975	32,913	18,352	3,611	2,959	1,149	4,540	6,093	14,561
1976	32,923	17,832	3,442	2,791	1,003	4,480	6,116	15,091
1977	31,672	17,373	3,410	2,641	959	4,266	6,097	14,299
1978	30,850	17,034	3,234	2,423	959	4,361	6,057	13,816
1979	31,200	17,230	3,321	2,494	979	4,495	5,943	13,944
	As a percent of all fields							
1965	100	64	18	13	4	16	14	36
1966	100	64	17	13	4	15	15	36
1967	100	64	17	13	4	15	15	36
1968	100	63	16	12	4	15	15	37
1969	100	62	15	13	4	15	15	38
1970	100	60	15	12	4	14	15	40
1971	100	59	14	11	4	14	16	41
1972	100	57	13	11	4	14	17	43
1973	100	56	12	10	4	14	17	44
1974	100	56	11	10	4	13	18	45
1975	100	56	11	9	3	14	19	44
1976	100	54	10	8	3	14	19	46
1977	100	55	11	8	3	13	19	45
1978	100	55	10	8	3	14	20	45
1979	100	55	11	8	3	14	19	45

[1] Including environmental sciences.
[2] Including statistics and computer specialities.
[3] Including psychology.
[4] Excluding first-professional degrees such as M.D., D.D.S., D.V.M., and J.D.
SOURCE: National Academy of Sciences

Table 87. Employed 1977 science/engineering graduates by field and level of degree, and field of employment in 1979

Field of degree	Field of employment[1]											
	Total employed	Chemistry	Physics/ astronomy	Other physical sciences	Mathematical sciences	Computer specialists	Environ. sciences	Engineering	Life sciences	Psychology	Social sciences	Non-science/ engineering
Bachelor's degree												
Total, all fields	207,500	5,800	500	800	2,200	15,700	3,600	46,800	19,600	4,300	5,400	103,000
Chemistry	5,300	3,000	60	60	—	80	—	500	200	—	30	1,300
Physics/astronomy	1,700	—	300	—	30	400	30	500	30	—	—	400
Other physical sciences	900	—	40	—	—	40	100	100	200	—	—	400
Mathematical sciences	12,000	70	—	—	1,500	4,400	40	900	40	—	100	5,000
Computer specialities	5,800	—	—	200	—	4,900	—	100	—	—	—	600
Environmental sciences	7,200	—	—	100	—	300	2,700	1,100	90	—	40	2,900
Engineering	45,100	40	40	10	90	1,900	200	39,500	200	—	—	3,200
Life sciences	49,200	2,500	—	400	100	700	400	2,800	18,200	—	500	23,600
Psychology	31,000	—	—	—	300	1,600	—	400	300	3,700	300	24,500
Social sciences	49,400	—	—	100	100	1,500	100	900	400	600	4,400	41,100
Master's degree												
Total, all fields	43,400	1,400	200	400	1,100	3,800	1,600	14,600	4,600	3,300	2,100	10,400
Chemistry	1,200	900	—	40	—	80	—	100	60	—	40	40
Physics/astronomy	700	40	200	60	20	150	40	200	20	—	—	60
Other physical sciences	300	—	—	80	—	—	—	150	—	—	—	40
Mathematical sciences	2,800	—	—	—	800	700	—	200	—	—	—	1,200
Computer specialties	2,400	—	—	—	30	1,600	30	300	—	—	—	500
Environmental sciences	2,000	10	10	70	—	90	1,000	300	30	—	20	400
Engineering	14,700	200	20	40	100	700	100	12,900	70	—	—	600
Life sciences	7,[illegible]	200	30	70	70	100	300	300	4,100	—	200	2,300
Psychology	6,000	—	—	—	30	200	—	30	50	3,300	—	2,500
Social sciences	5,500	100	—	—	30	200	100	200	200	30	1,900	2,800

[1] Does not include full-time graduate students.

NOTE: Detail may not add to totals because of rounding.

SOURCE: National Science Foundation, unpublished data

related publications con.

	NSF No.	Price
Academic Science: Graduate Enrollment and Support, Fall 1979	80-321	----
Employment of Scientists, Engineers, and Technicians in Manufacturing Industries, 1977	80-306	----
U.S. Scientists and Engineers, 1978	80-304	----
Characteristics of Experienced Scientists and Engineers, 1978	79-322	----

Reports

R&D Funds

	NSF No.	Price
Federal Support to Universities, Colleges, and Selected Nonprofit Institutions, Fiscal Year 1979	81-308	In press
Federal Funds for Research and Development, Fiscal Years 1979, 1980, and 1981, Volume XXIX	81-306	$3.75

S/E Personnel

	NSF No.	Price
The Stock of Science and Engineering Master's Degree-Holders in the United States	81-302	----
Employment Attributes of Recent Science and Engineering Graduates	80-325	$1.75
Scientists, Engineers, and Technicians in Private Industry, 1978-80	80-320	$2.00
Occupational Mobility of Scientists and Engineers	80-317	$1.75
Employment Patterns of Academic Scientists and Engineers, 1973-78	80-314	$1.75
Projections of Science and Engineering Doctorate Supply and Utilization, 1982 and 1987	79-303	$2.25

Composite

	NSF No.	Price
Academic Science, 1972-77: R&D Funds, Scientists and Engineers, and Graduate Enrollment and Support	80-313	$4.25

Reviews of Data on Science Resources

R&D Funds

	NSF No.	Price
No. 35. "State and Local Government R&D Expenditures, FY 1977"	80-302	$1.25

S/E Personnel

	NSF No.	Price
No. 34. "Sex and Ethnic Differentials in Employment and Salaries Among Federal Scientists and Engineers"	79-323	$1.00
No. 33. "U.S. Industrial R&D Spending Abroad"	79-304	$0.70